

U.S. Department of Energy



Performance and Accountability Report




Fiscal Year 2005

DOE/CF – 0001

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www.cfo.doe.gov/progliaison/par2005.htm

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In recognition of your outstanding efforts
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Department of Energy Team accepting Certificate of Excellence in Accountability Reporting at the awards reception held by the Association of Government Accountants.

MESSAGE FROM THE SECRETARY

I am pleased to present our Performance and Accountability Report for fiscal year 2005. This report details our goals and progress towards securing the Nation's energy future, pursuing cutting-edge scientific research, and finishing the environmental clean-up of our Cold War nuclear weapons legacy.

In August, President Bush signed into law the landmark Energy Policy Act of 2005, which will encourage energy efficiency and conservation, increase domestic energy production, help modernize the electricity grid and improve electric reliability, and promote the expansion of nuclear energy.

In addition to enhancing our Nation's energy security, the Department also sponsors world-class scientific research through our network of national laboratories and other facilities by investing heavily in scientific programs and infrastructure. And we have moved forward on efforts to establish a repository at Yucca Mountain to safely isolate highly radioactive nuclear waste.

The past year also has witnessed difficult times for many American families, and for our energy sector. Events such as Hurricanes Katrina and Rita have deeply affected the Nation and the Federal Government. In response to these disasters, the Department took several steps to help alleviate energy supply disruptions and restore normal energy services, including the release of oil from the Strategic Petroleum Reserve. In addition, we have launched a comprehensive, national campaign to improve energy efficiency for consumers, businesses and the government.

To meet these various challenges, the Department has been guided by the President's Management Agenda. This report highlights how we are making lasting management improvements and optimizing the use of taxpayer dollars. I am pleased to report that the Department received the Certificate of Excellence in Accountability Reporting from the Association of Government Accountants for our fiscal year 2004 Performance and Accountability Report. This award recognizes agencies whose annual reports achieve the highest standards in presenting financial and performance information, and validates the Department's commitment to exceptional reporting.

The Department has completed evaluations of its management controls and financial management systems and, based on these evaluations, I am providing a statement of assurance that the Department meets the objectives required by the Federal Managers' Financial Integrity Act. However, while the Department finds that its financial management systems generally conform to governmental financial system requirements, we have identified 11 significant issues that represent key areas of focus for the Department where corrective actions are being taken.

In the area of financial reporting, the independent public accounting firm KPMG LLP, working for the Department's Inspector General, was engaged to audit the fiscal year 2005 financial statements contained in this report. Based on this review, the independent auditors issued a disclaimer of opinion and reported a material weakness in internal control relating to financial control and reporting. The Department faced significant challenges resulting from the combined effect of the consolidation of our finance and accounting operations and implementation of a new, commercial off-the-shelf accounting system.

As a result, the Department has identified financial control and reporting as a significant issue under the Federal Managers' Financial Integrity Act. We have already resolved many initial challenges and will continue taking actions to complete key reconciliations and resolve system conversion issues as further described in this report. I can provide reasonable assurance that the performance information contained in our report is complete and reliable and describes the results achieved towards our goals and the challenges that remain.

As our country faces many new and evolving challenges, be assured that the Department is prepared to protect the energy security of the Nation, and will strive to provide effective stewardship over the public funds entrusted to us by the American people.



A handwritten signature in black ink that reads "Samuel W. Bodman".

Samuel W. Bodman
November 15, 2005

FOREWORD

The Reports Consolidation Act of 2000 authorizes Federal agencies to consolidate various reports in order to provide performance, financial and related information in a more meaningful and useful format. In accordance with the Act, the Department of Energy's (Department or DOE) Performance and Accountability Report (PAR) is a consolidation of reporting requirements that will serve multiple audiences and users with varied levels of detail. This report is organized by the following three sections and provides a thorough documentation of the stewardship of our mission-critical resources and services provided to the American people.

Management's Discussion and Analysis section provides information on the Department's mission, its organizational structure, and its financial resources. It provides executive-level information on the Department's management controls, systems and compliance with laws and regulations and identifies the most significant management issues and challenges facing the Department. This section also highlights the Department's performance within our critical mission objectives and describes the methods employed to monitor, assess, verify and validate our performance information.

Performance Results section provides detailed information and an assessment of our progress on all of the Department's performance goals and targets for the past four years.

Financial Results section provides a Message from the Chief Financial Officer, the Department's consolidated and combined financial statements, Auditors' Report, the Inspector General's and Performance Management Challenges and other statutory reporting.

THIS REPORT MEETS THE FOLLOWING LEGISLATED REPORTING REQUIREMENTS:

Department of Energy Organization Act of 1977 – requires an annual report on agency activities.

Federal Managers' Financial Integrity Act (FMFIA) of 1982 – requires a report on the status of management controls and the most serious problems.

Federal Financial Management Improvement Act (FFMIA) of 1996 – requires an assessment of the agency's financial systems for adherence to government-wide requirements.

Inspector General (IG) Act of 1978 (Amended) – requires information on management actions in response to Inspector General audits.

Government Performance and Results Act (GPRA) of 1993 – requires performance results achieved against all agency goals established.

Government Management Reform Act (GMRA) of 1994 – requires agency audited financial statements.

Reports Consolidation Act of 2000 – requires the consolidated reporting of performance, financial and related information in a Performance and Accountability Report.

Improper Payment Information Act (IPIA) of 2002 – requires reporting on agency effort to identify and reduce erroneous payment.

Federal Information Security Management Act (FISMA) of 2002 – requires annual evaluations of information security programs and practices.

Management's Discussion & Analysis





MANAGING OUR ENERGY SECURITY

History & Mission

The Department has one of the richest and most diverse histories in the Federal Government, with its lineage tracing back to the Manhattan Project and the race to develop an atomic bomb during World War II. Following that war, Congress created the Atomic Energy Commission (1946) to take control over the scientific and industrial complex supporting the Manhattan Project and to maintain civilian government control over atomic research and development.

In October 1977, Congress passed the Department of Energy Organization Act, creating the Department of Energy. That legislation brought together for the first time not only most of the government's energy programs, but also science and technology programs and defense responsibilities that included the design, construction, and testing of nuclear weapons. Over its history, the Department has shifted its emphasis and focus as the energy and security needs of the Nation have changed. Since the end of the Cold War, the Department has intensified its efforts in environmental cleanup of the nuclear weapons complex, nuclear nonproliferation and nuclear weapons stewardship, reliable energy supplies and delivery, energy efficiency and conservation, and the transfer of new technologies between governmental and commercial entities. Today, the Department contributes to the future of the Nation by ensuring our energy security, maintaining the safety and reliability of our nuclear stockpile, cleaning up the environment from the legacy of the Cold War, and developing innovation in science and technology. The map and charts that follow identify our key facilities and resources supporting our mission.



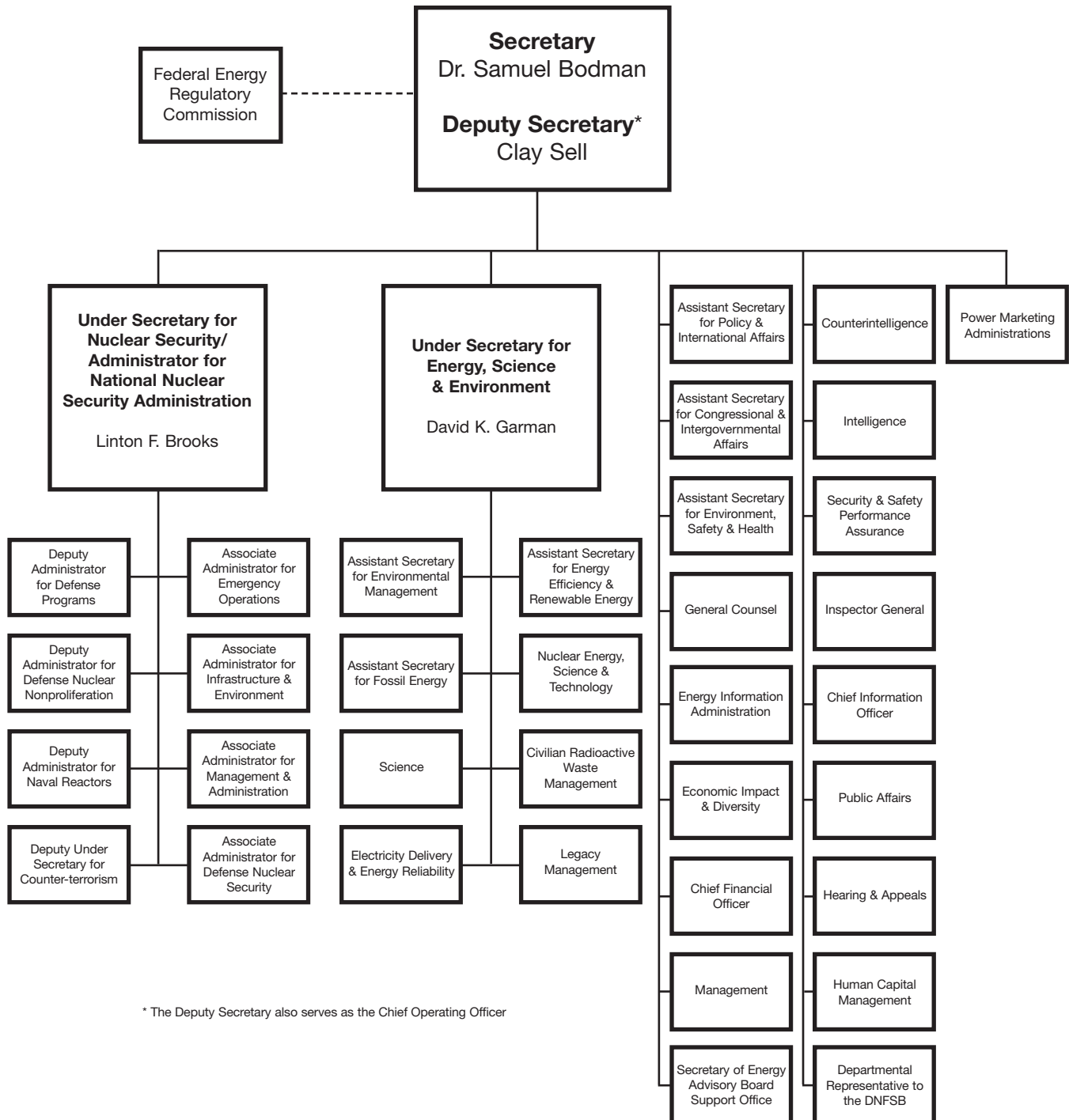
President Carter signing the Department of Energy Organization Act in August 1977.

Our Mission

- To advance the national economic and energy security of the United States;
- To promote scientific and technological innovation in support of that mission;
- To ensure the environmental cleanup of the national nuclear weapons complex.

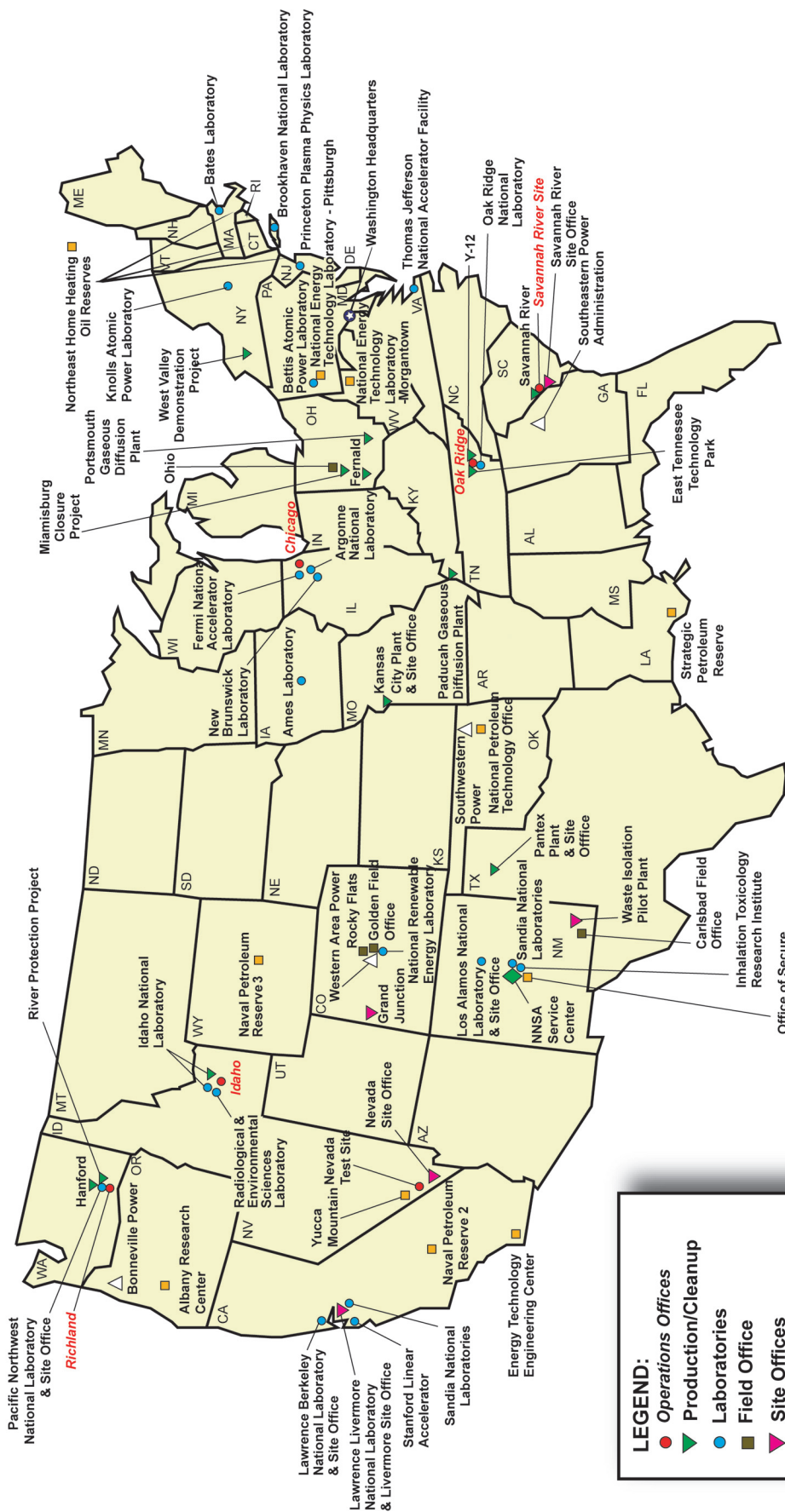
Organization & Locations

Department of Energy



* The Deputy Secretary also serves as the Chief Operating Officer

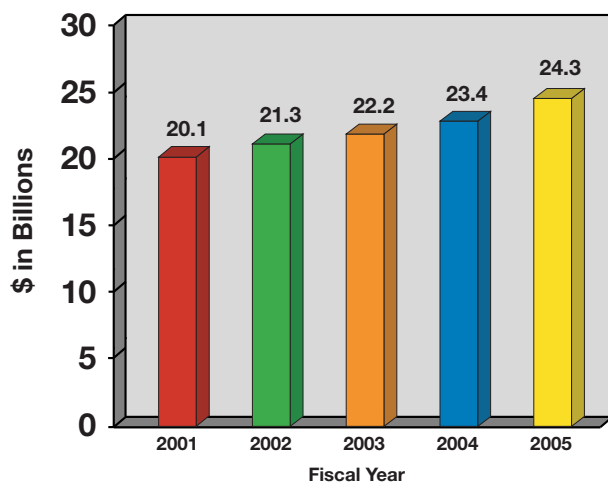
Major DOE Laboratories and Field Facilities



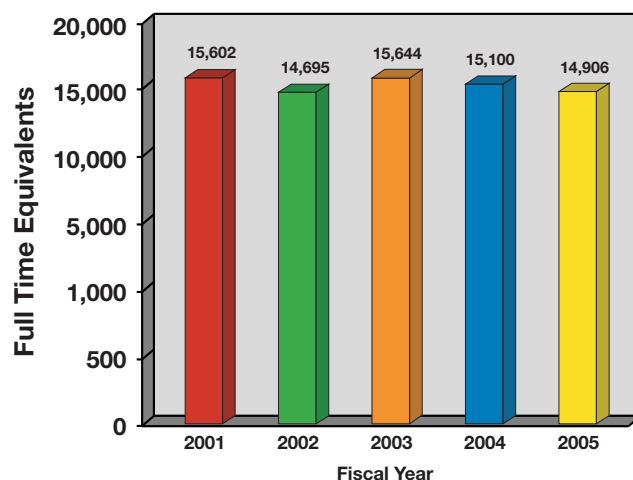
NOTE - Location within each state is not to scale.

Resources

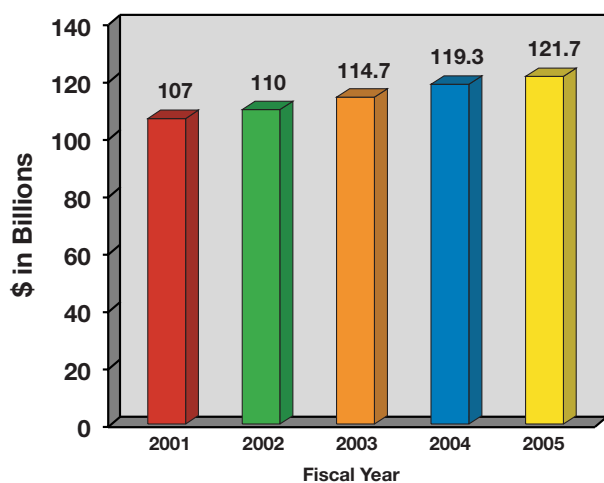
FUNDING



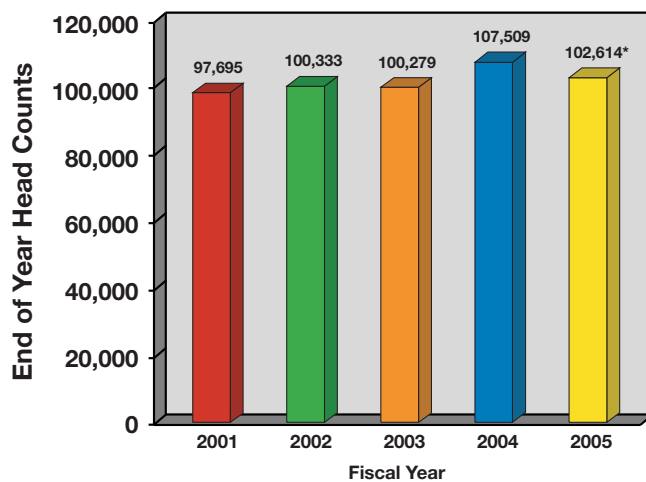
FEDERAL EMPLOYEES



ASSETS







CONTRACTOR EMPLOYEES



* Based on actual and estimated head costs

Strategic Goals

The Department pursues the following four strategic goals and seven supporting general goals to achieve our mission. The performance, financial and other related information presented in this report is structured around these goals.

Strategic and General Goals		Resources Applied (in millions)	
Defense	Strategic Goal To protect our national security by applying advanced science and nuclear technology to the Nation's defense.	\$	Program Costs \$ 8,780
	General Goals 1 – Maintain nuclear weapons stockpile 2 – Detect and prevent nuclear proliferation 3 – Support nuclear power needs of the U.S. Navy		Federal Employees 2,394*
Energy	Strategic Goal To protect our national and economic security by promoting a diverse supply and delivery of reliable, affordable, and environmentally sound energy.	\$	Program Costs \$ 6,617
	General Goal 4 – Enhance energy security		Federal Employees 6,712*
Science	Strategic Goal To protect our national and economic security by providing world-class scientific research capacity and advancing scientific knowledge.	\$	Program Costs \$ 3,565
	General Goal 5 – Maintain a world-class scientific research capacity		Federal Employees 921*
Environment	Strategic Goal To protect the environment by providing a responsible resolution to the environmental legacy of the Cold War and by providing for the permanent disposal of high-level radioactive waste.	\$	Program Costs \$7,240
	General Goals 6 – Clean up contamination of sites 7 – Establish a permanent repository for high-level radioactive waste.		Federal Employees 1,939*

* These Federal Employee numbers do not include the combined 2,940 Federal Energy Regulatory Commission and Corporate Management employees (e.g. CFO, General Counsel, etc.) that support the above four strategic goals.

PROGRAM PERFORMANCE HIGHLIGHTS

Performance Overview

The Department continues to work toward the goals established in our September 2003 *Strategic Plan* (<http://strategicplan.doe.gov>). The following sections focus on progress made toward the Department's four strategic goals in the areas of Defense, Energy, Science and Environment. The Department's progress toward these strategic goals is described within the context of outcome-based general goals and program goals, and key, output-based annual performance targets. Programmatic benefits to the public are discussed, as are the external factors that may impact achievement of the Department's goals.

Detailed performance results are included in the Performance Results section providing the year-end assessment of each annual performance target for fiscal year (FY) 2005, performance information for the past three fiscal years (FY 2002-2004), and the status of unmet FY 2004 performance targets.

Performance Management Framework

The Performance Management Framework illustrates the hierarchical relationship of performance elements within the Department. During performance planning, Departmental goals determine the scope of supporting elements; consequently, progress against these goals is indicated by actual performance at the lower levels.



Mission – The Department of Energy's mission is to advance the national, economic and energy security of the United States; to promote scientific and technological innovation in support of that mission; and to ensure the environmental cleanup of the national nuclear weapons complex.

Strategic Goals – The Department has four strategic goals that support the achievement of this mission. A strategic goal is a statement of aim or purpose that may not be directly measurable. Strategic goals are used by the Department to guide the creation of general goals and program goals, which are focused on producing outcomes required to accomplish the Department's mission.

General Goals – The Department has seven long-term general goals that support the four strategic goals. A general goal defines more specifically what the Department plans to achieve in carrying out its mission over a period of time. General goals are expressed as outcomes, which allow for the future assessment of progress toward the goal.

Program Goals – Outcome-based program goals bridge the gap between long-term general goals and annual performance targets. The Department has 59 program goals, spread across 11 Departmental administrations and offices. Because the program goals are focused on the core missions of the administrations and offices to which they are assigned, program goals are critical mid-level indicators of Departmental performance.

Annual Performance Targets – The Department tracked 246 annual performance targets in FY 2005. These targets establish a measurable performance baseline against which actual achievement is assessed. Annual performance targets may be either outcomes or outputs.

Performance Scorecard

Each Strategic Goal section includes a Performance Scorecard that reveals both cost (program costs and budgetary expenditures) and performance information in a consolidated presentation.

Program costs are defined as full period costs computed using the accrual basis of accounting that recognizes expenses when incurred regardless of when the related budgetary expenditures are made. Budgetary expenditures represent the goods and services received during the current year for which the Department has paid or will be required to pay in the future. It is important to note that the budgetary expenditures will not equal program costs in any particular year because there are significant timing differences between accrued cost and recognition of

budgetary expenditures. For example, an asset with a useful life of ten years, purchased in the current year, would have its full cost recognized as a budgetary expenditure, while its full cost for accounting purposes would be spread over its ten-year useful life. Conversely, an unfunded liability recorded in the current year would be recognized as a program cost in the current year, yet would not be recognized as a budgetary expenditure until funding is made available to liquidate the liability.

Actual performance against annual performance targets is recorded on a quarterly basis in the Department's performance measurement tracking system. These results indicate progress toward associated program goals, and ultimately general and strategic goals. Performance goals and targets are rated as either Green, Yellow or Red. For FY 2005, the definitions used for rating annual targets and program goals are as follows:

Ratings of Program Goals and Annual Targets

100% Met	Green
≥ 80% Met; but < 100% Met	Yellow
< 80% Met; or Undetermined	Red

A more detailed depiction of the Department's performance elements is shown on the following page with number of annual targets in parenthesis.

Based on actual performance, current resources, and the national energy and economic outlook, the Department adjusts its strategies for achieving its goals. This ensures that the Department is continuously fulfilling its mission.

Departmental performance targets described in this report are aligned with the Department's Strategic Plan. Performance goals and targets included in the Department's FY 2005 Performance Budget, submitted to Congress in February 2004, may differ slightly from those described in this report. Some targets were revised based on the Continuing Resolution, actual FY 2005 Congressional appropriations and executive direction. A more detailed depiction of the Department's performance elements is shown on the following page with the number of annual targets in parenthesis.

Performance Validation and Verification

Validation and verification of the Department's performance is accomplished by certifications, periodic reviews, and audits. The Department's end-of-year reporting process includes certifications by heads of program elements that the reported results are accurate. The results are internally reviewed by the Department for quality and completeness, while key internal controls related to performance reporting are considered by the Department's independent auditors. Source data substantiating performance target results is maintained by the program offices, the National Laboratories,

and the Department's contractor work force. Due to the size and diversity of the Department's portfolio, validation and verification is also supported by the following activities:

Budget Preparation Analysis: Validating and verifying program contributions to the Department's strategic and general goals is a routine part of reviewing and analyzing the annual performance budget submission. Performance targets submitted at each phase of budget development are also reviewed to ensure that they contribute effectively to the achievement of the program and Departmental goals. (<http://www.mbe.doe.gov/budget/index.htm>)

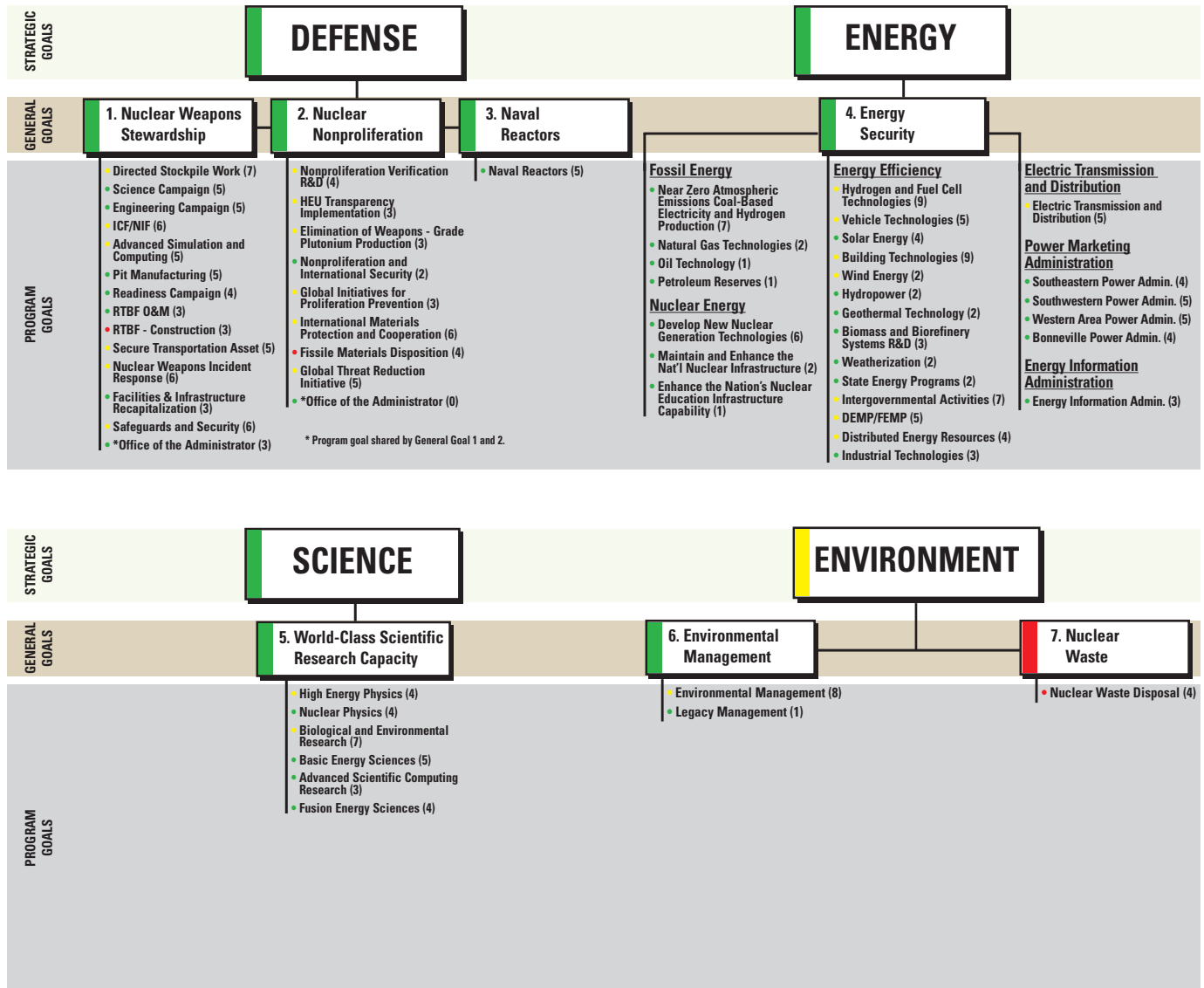
Internal Controls: Training and other forward-looking actions have helped the Department maintain a strong commitment to internal controls that serve to enhance validation and verification of program performance. For example, the Department provides quarterly training that addresses areas such as internal controls over performance measurement, the relevance and meaningfulness of performance targets, and the auditability and accuracy of reported performance results.

Automated Systems: Tracking and evaluating program performance is accomplished by an automated system known as Joule. The system allows for remote data entry of quarterly performance results by Departmental administrations and offices, as well as remote monitoring and oversight by Headquarters. Joule provides the end-of-year performance information that is included in the PAR.

External Independent Analysis: Program performance assessments are also conducted by the Office of Management and Budget (OMB) through the use of its Program Assessment Rating Tool (PART). PART results reveal that a majority of the Department's assessed programs periodically initiate independent evaluations to gauge program effectiveness and to support program improvements. PART assessments include long-term and annual performance measures. The Department continues to strive for better alignment between its PART measures and the program goals and annual targets included in the Department's performance budget submission to Congress. (<http://www.omb.gov/part>) Departmental programs and activities are also reviewed and audited on an on-going basis by the Department's Office of Inspector General (<http://www.ig.doe.gov/reports.htm>) and the Government Accountability Office (<http://www.gao.gov/index.html>).

Management Reviews: Evaluating the effectiveness of established management controls is a requirement of the FMFIA Act of 1982. Accordingly, the Department performs annual evaluations of its management controls to provide reasonable assurance that they are working effectively; that program and administrative functions (including the accuracy and reliability of the reporting of performance results) are performed in an economical and efficient manner consistent with applicable laws; and that the potential for waste, fraud, abuse or mismanagement of assets is minimized.

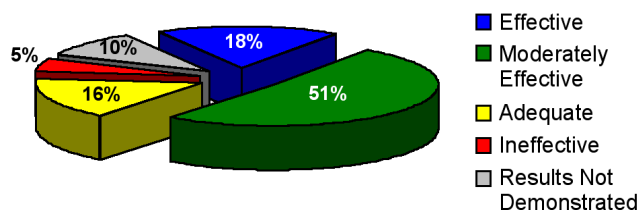
DOE Strategic Goals & Annual Performance Targets



Program Assessment Rating Tool

PART was developed by OMB in 2002 as a key component for implementing the President's Management Agenda (PMA), particularly the Budget and Performance Integration initiative. PART grew out of the Administration's desire to provide federal agencies with a disciplined tool for assessing program planning, management, and performance against quantitative, outcome-oriented goals. As an instrument for periodically evaluating the efficiency and effectiveness of federal programs, PART enables managers to identify and rectify real and potential problems associated with program performance.

DOE PART Performance



Through FY 2005, the Department has completed official assessments for 39 of its 59 programs putting it on track with OMB's implementation schedule for the federal government. Of these 39, over half are rated as "Moderately Effective" or "Effective." More information on the Department's PART scores and OMB's findings are available at <http://www.cfo.doe.gov/progliaison/part2005.htm>.

PART provides a mechanism for the Department and OMB to develop meaningful long-term and annual measures and targets for each program. Presently, there is little commonality between PART performance measures and the performance measures included in the Department's Congressional budget submission and reported on in the PAR. As programs are assessed using the PART, the Department will strive to make its program goals and annual performance targets consistent with PART long-term goals and annual targets, although structural differences make this difficult. OMB continues to work with the Department to develop performance targets that meet criteria established by PART guidance.

The Department of Energy has vigorously incorporated the PART into its day-to-day program management decision-making processes. During FY 2005, the Department completed PART assessments for all of its programs, including 20 programs not yet scheduled for official OMB assessment. PART assessments are typically included in program reviews, alongside other performance and financial information, helping managers identify issues and make future programming decisions.

Ultimately, the PART is designed to be an iterative process, capable of tracking the evolution of program performance over time through periodic reassessments. Key to this process are the recommendations that OMB develops during the assessment process to foster program improvement. Actions taken toward implementing PART recommendations are tracked by offices and reported to OMB annually. To see the Department's assessment of PART recommendations developed as part of the FY 2005 PART cycle (conducted during calendar year 2003) please refer to the previously identified website .

The on-going implementation and review of PART recommendations, coupled with the utilization of performance information derived from assessments and periodic reassessments, signify the PART as an integral process for planning and budget decision-making, as opposed to a set of one-time program evaluations. The Department will continue to make good use of this tool to ensure mission success.

Defense

— MEETING NATIONAL SECURITY CHALLENGES —

*To protect our national security by applying advanced science
and nuclear technology to the Nation's defense.*

One of the primary responsibilities of the Department is to enhance national security through the application of nuclear technology. To accomplish this goal the Department oversees:

- Maintenance and certification of the U.S. nuclear weapons stockpile;
- Development of responsive infrastructure that can adapt quickly to stockpile changes while still drawing down the stockpile of weapons excess to defense needs;
- Security of the nuclear complex, and strengthening of international nuclear nonproliferation controls;
- Reduction in global danger from weapons of mass destruction; and

- Provision to the U.S. Navy of safe and effective nuclear propulsion systems.

The National Nuclear Security Administration (NNSA), a semiautonomous agency within the Department, is responsible for these activities critical to our national security.

■ General Goal 1: Nuclear Weapons Stewardship

Ensure that our nuclear weapons continue to serve their essential deterrence role by maintaining and enhancing the safety, security, and reliability of the U.S. nuclear weapons stockpile.

Defense Performance Scorecard (\$ in millions)

General Goals and Scores	Program Costs		Program Goals and Scores		FY 2005 Budgetary Expenditures Incurred*	Performance of Annual Targets			
	FY 2005	FY 2004				Met (100%)	Not Met (> 80%) but < 100%	Not Met (< 80%)	Undetermined
1. Nuclear Weapons Stewardship	\$6,779	\$6,220	Directed Stockpile Work	Y	\$1,717	5	1	1	0
			Science Campaign	G	\$269	5	0	0	0
			Engineering Campaign	G	\$273	5	0	0	0
			ICF/NIF	Y	\$502	3	3	0	0
			Advanced Simulation and Computing	Y	\$686	3	2	0	0
			Pit Manufacturing	G	\$262	5	0	0	0
			Readiness Campaign	G	\$275	4	0	0	0
			RTBF O&M	G	\$203	3	0	0	0
			RTBF Construction	R	\$185	0	0	3	0
			Secure Transportation Asset	Y	\$206	3	2	0	0
			Nuclear Weapons Incident Response	Y	\$119	5	1	0	0
			Facilities & Infrastructure Recapitalization	G	\$331	3	0	0	0
			Safeguards and Security	Y	\$702	4	1	1	0
			Office of the Administrator **	G	\$372	3	0	0	0
2. Nuclear Non-Proliferation	\$1,191	\$1,101	Nonproliferation Verification R&D	Y	\$241	3	1	0	0
			HEU Transparency Implementation	Y	\$18	2	1	0	0
			Elimination of Weapons-Grade Plutonium Production	Y	\$153	2	1	0	0
			Nonproliferation and International Security	G	\$137	2	0	0	0
			Global Initiatives for Proliferation Prevention	Y	\$50	2	1	0	0
			International Materials Protection and Cooperation	Y	\$369	3	2	1	0
			Fissile Materials Disposition	R	\$479	1	1	2	0
			Global Threat Reduction Initiative	Y	\$6	3	1	1	0
3. Naval Reactors	\$810	\$740	Office of the Administrator **	G	—	—	—	—	—
			Naval Reactors	G	\$933	5	0	0	0
Total Cost	\$8,780	\$8,061			\$10,316	74	18	9	0

* Includes capital expenditures but excludes such items as depreciation, changes in unfunded liability estimates and certain other non-fund costs, and allocations of Departmental administration activities.

** Program goal and associated annual targets are shared by General Goal 1 and 2.

One of the most important responsibilities of the Secretary of Energy, in cooperation with the Secretary of Defense, is certifying to the President that the Nation's nuclear weapons stockpile is safe, secure, and reliable. To do so, the NNSA:

- Maintains a nuclear weapons stockpile surveillance and engineering capability;
- Refurbishes and extends the lives of selected nuclear systems; and
- Maintains a science and technology base, including the ability to restore the manufacturing infrastructure for the production of replacement weapons, should the need arise.

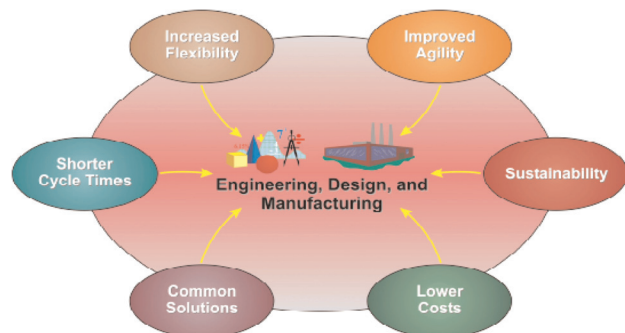
These capabilities ensure the vitality of our nuclear weapons without the need for underground nuclear testing.

➔ How We Serve the Public

Each year the NNSA certifies the readiness of 100 percent of the strategically deployed nuclear weapons, an activity necessitated when the United States stopped development and production of new nuclear warheads following the end of the Cold War and established a moratorium on nuclear testing. To this end, the Department adopted a science-based Stockpile Stewardship Program (SSP) that emphasizes development and application of greatly improved technical capabilities to assess the safety, security, and reliability of existing nuclear warheads without the use of nuclear testing.

Securing and Refurbishing the Weapons Complex.

- Following the events of the September 11, 2001 terrorist attacks, the Department issued a revised Design Basis Threat (DBT) in May 2003 that identified a postulated threat in terms of the number of possible adversaries and weapons capabilities at DOE sites. The NNSA continued to implement the stringent Site Implementation Plans in the Department's DBT during FY 2005.
- To address the underfunding of infrastructure following the end of the Cold War, the Facilities and Infrastructure Recapitalization Program (FIRP) was created to reduce the backlog of deferred maintenance at stockpile-related



Responsive Infrastructure

facilities to an acceptable level consistent with industry standards. The Readiness in Technical Base and Facilities (RTBF) program provides the funding needed for the ongoing operations and maintenance needs of the nuclear weapons complex.

- Several major construction projects address the refurbishment of the complex, including the Chemistry and Metallurgy Research Facility Replacement (CMRR) at Los Alamos National Laboratory. This project will relocate and consolidate mission critical research and development capabilities, while providing storage for special nuclear material. The Modern Pit Facility Project (MPF), the disposition of which is still being determined, will have the capability to produce meaningful quantities of stockpile-certified plutonium pits that serve as the “triggers” of modern nuclear weapons. Both projects support the long-term requirements of the nuclear weapons deterrent.

Reduction in the Number of Existing Weapons.

- On May 24, 2002, the President signed the Strategic Offensive Reduction Treaty (commonly referred to as the Moscow Treaty) with Russian President Vladimir Putin. The Moscow Treaty called for a two-thirds reduction over the next decade in the number of operationally deployed strategic nuclear warheads. To implement the treaty, the NNSA, in conjunction with the Department of Defense, will reduce the number of warheads from 6,000 to between 1,700 and 2,000 by 2012. Russia has agreed to similar reductions.
- In a report to Congress dated June 3, 2004, the NNSA Administrator described the plan for the overall reduction of the U.S. nuclear weapons stockpile. The plan will lead to a significant decline – by nearly half – in the size of the total U.S. nuclear weapons stockpile (deployed weapons, spares, etc.) by 2012. Such a level has not been realized in several decades.



Signing of the Strategic Offensive Reduction Treaty by Russian President Vladimir Putin and President George W. Bush

- The reduction in the number of warheads allows for certain programmatic realignments. Since fewer warheads will need to be refurbished and maintained, more resources can be directed at developing a smaller, more responsive infrastructure in the U.S. to maintain deterrence and respond to evolving future threats. In addition, increased resources for U.S. assistance to help Russia with its significant warhead dismantlement requirements of the Moscow Treaty can also be anticipated.
- Two Savannah River Site facilities, the Pit Disassembly and Conversion Facility (PDCF) and the Tritium Extraction Facility (TEF) will aid in the reduction of the existing stockpile. Disassembly of obsolete pits and extraction of tritium from existing warheads are fundamental steps in dismantling a nuclear weapon. As the stockpile shrinks so does the need for tritium renewal, another function of the TEF. The capacity to decommission additional retired warheads is thereby enhanced.

Reliable Replacement Warhead.

- The Reliable Replacement Warhead (RRW) was a concept initiated by Congress in FY 2005 to provide greater performance margins and state-of-the-art surety features in a new weapons design. RRWs would trade off prior features such as high yield and low weight for a variety of attributes, including elimination of some hazardous materials, greater ease of certification without nuclear testing, increased long-term confidence in the stockpile, and lower costs. Also, the RRW facilitates the goal of a more responsive infrastructure.
- Congress' Sustainable Stockpile Initiative (SSI) is an integrated plan to produce a RRW certifiable design while implementing an infrastructure reconfiguration proposal that maximizes special nuclear materials consolidation. The Secretary of Energy's Advisory Board (SEAB) Draft Final Report, *Recommendations for the Nuclear Weapons Complex for the Future*, July 13, 2005, provided initial suggestions for a reconfigured weapons complex ranging from a reduction to only three of the existing sites, to a single Consolidated Nuclear Production Center.

➔ Performance Against Key Targets

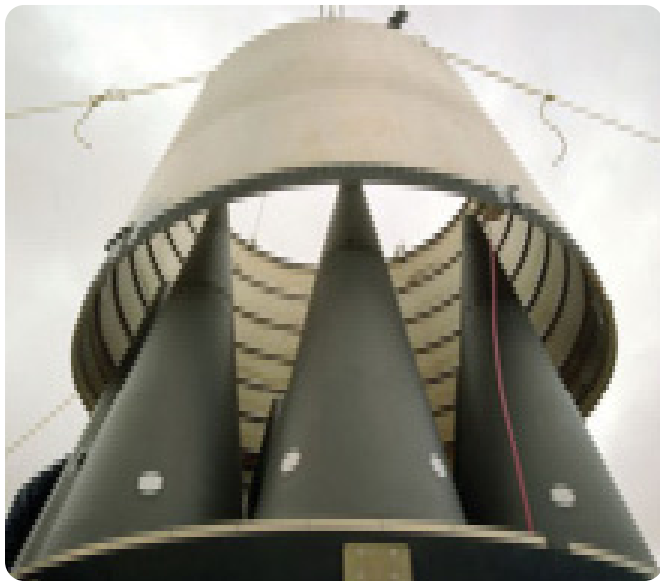
The NNSA ensures that the nuclear warheads and bombs in the U.S. nuclear stockpile are safe, secure, and reliable by:

- Developing solutions to extend weapon life and correcting potential technical issues;
- Conducting scheduled warhead/bomb maintenance;
- Dismantling warheads/bombs retired from the stockpile;
- Conducting evaluations to certify warhead/bomb reliability and to detect/predict potential weapon fixes, mainly from aging;

- Producing and refurbishing warheads/ bombs to install the life extension solutions and other fixes; and
- Researching advanced concepts to serve their essential deterrence role by maintaining and enhancing the safety, security, and reliability of the U.S. nuclear weapons stockpile.

During FY 2005, the NNSA:

- Completed the surety and assessment reports to support certification on the nuclear stockpile. (NA GG 1.27.01) This assessment/certification activity, conducted jointly with the Department of Defense (DoD), is critically important to U.S. national security in the absence of underground nuclear weapon testing, which has been banned by U.S. adherence to the 1992 moratorium.
- Completed 27 percent of the life extension programs for the B61-7/11, W76-1, and W80-3 weapons for the U.S. Navy and Air Force, though technical difficulties have resulted in some minor delays. (NA GG 1.27.03-05) Extending the life of existing weapons has been a cost-effective way to provide nuclear security.
- Successfully addressed technical delays associated with the first 2-axis hydrodynamics test at the Dual-Axis Radiographic Hydrotest (DARHT) facility, scheduled for 2008. (NA GG 1.28.02) DARHT is designed to provide x-ray images of weapons implosion processes, supporting weapons certification and assessment.
- Completed 81 percent of the construction of the National Ignition Facility (NIF), as targeted. (NA GG 1.30.3). NIF is designed to create and measure extreme temperature and pressure conditions of a simulated nuclear explosion. Although still under construction, four of the NIF's 192 laser beams are already operating and being used to conduct experiments in thermonuclear fusion ignition and high-energy-density physics.
- Nearly achieved a computing production platform of 100 trillion operations per second (NA GG 1.31.03). This capability, part of the Advanced Simulation Computing Campaign will ultimately help conduct nuclear stockpile certification for all weapons systems by using highly complex, three dimensional simulations.
- Completed 87 percent of the Tritium Extraction Facility (TEF) within the cost estimate, as targeted. (NA GG 1.33.04) The TEF is designed to extract and refresh tritium in a nuclear weapon. The program also worked to recover from safety and security stand-downs delaying construction of the Modern Pit Facility (MPF). (NA GG 1.32.02) The MPF will restore the capability to produce plutonium pits. When completed, these two construction projects will restore nuclear weapon production capabilities.



W87 PEACEKEEPER warheads.

- Reduced deferred maintenance within the nuclear weapons complex by more than \$154.8 million as part of the Facilities and Infrastructure Recapitalization program, meeting the annual target. (NA GG 1.38.01). The 2009 date for elimination of \$1.2 billion of the deferred maintenance backlog has slipped due to constrained outyear funding.
- Implemented maritime radiation search programs at all eight Radiological Assistance Program (RAP) Regions, as part of the Nuclear Weapons Incident Response (NWIR) program. (NA GG 1.35.01) NWIR responds to and mitigates nuclear and radiological incidents worldwide with capabilities that include technical personnel, equipment for monitoring and predicting environmental impacts of radiation, and medical and health support.
- Completed 106 secure convoys of special nuclear material to meet DOE, DoD, and other customer requirements, using advanced equipment and highly trained personnel. (NA GG 1.36.01) This was up from 91 a year earlier, showing steady year-to-year growth.

➔ External Factors Related to General Goal 1

The following external factors could affect the Department's ability to achieve this goal:

- **Technology:** Technological development is inherently unpredictable. The discovery of an insurmountable scientific or engineering obstacle in a credible science-based stockpile stewardship program could force the resumption of underground nuclear testing.
- **Nuclear Threats:** Changes in the nuclear threats posed to the United States could require changes to our nuclear weapons stewardship programs.

■ General Goal 2: Nuclear Nonproliferation

Provide technical leadership to limit or prevent the spread of materials, technology, and expertise relating to weapons of mass destruction; advance the technologies to detect the proliferation of weapons of mass destruction worldwide; and eliminate or secure inventories of surplus materials and infrastructure usable for nuclear weapons.

The NNSA reduces the threat posed by the proliferation of fissile material by helping to secure foreign stockpiles of weapons-grade material, especially in Russia. In addition, the NNSA oversees the dismantlement, destruction, and ultimate disposition of weapons including the down-blending of highly-enriched uranium (HEU) or the burning of plutonium as mixed oxide fuel (MOX) in nuclear energy plants. The NNSA further reduces risk by controlling exports of nuclear-related technologies, monitoring borders for the movement of fissile materials, and facilitating the employment of foreign scientists and engineers employed in nuclear weapons facilities located in Russia and elsewhere in other more peaceful pursuits.



Highly enriched Uranium (HEU) is down-blended with other forms of uranium to produce Low Enriched Uranium (LEU), suitable for commercial, civilian purposes.

➔ How We Serve the Public

- In 2004, the Secretary of Energy announced the Global Threat Reduction Initiative, a comprehensive plan to secure and remove from vulnerable sites around the world high-risk nuclear and radiological materials that pose a threat to the United States and the international community, significantly contributing to the NNSA's ongoing work in nuclear nonproliferation. As part of this initiative, the Department developed a threat-based, prioritized approach to systematically address facilities that possess high-risk fissile and other nuclear materials.

- A bilateral agreement was signed in 2004 regarding the repatriation of Russian-origin HEU research reactor fuel to Russia. More than 20 research reactors in 17 countries have been identified as having Russian/Soviet-supplied fuel. NNSA is reducing the world's stocks of dangerous materials, such as HEU, through a variety of programs to convert this material to low enriched uranium (LEU), and plutonium, through fissile materials disposition programs in the United States and Russia. The NNSA is also working with its Russian counterparts to eliminate Russian plutonium production. For U.S.-origin spent fuel, NNSA is accepting fuel from foreign repositories for final disposition.
- At the February 2005 Bratislava Summit, the Presidents of the United States and Russia committed to expanding and deepening cooperation on nuclear security. The United States and Russia pledged to continue cooperation on security upgrades of Russian nuclear facilities and develop a plan of work through and beyond 2008. They also agreed to focus increased attention on "security culture," to include fostering disciplined, well-trained and responsible nuclear material custodians.
- Other non-proliferation activities include NNSA's successful "Megaports" initiative which installs sophisticated radiation detection equipment at many of the world's international ports. This initiative, in conjunction with the Second Line of Defense (SLD) program, provides detection systems at vulnerable seaports, airports and other land border crossings worldwide in order to minimize the risk of nuclear proliferation and terrorism through detection and deterrence of illicit trafficking in plutonium, HEU and other radioactive materials at international borders.

➔ Performance Against Key Targets

The Department draws from its world-class scientific and technical expertise, and leverages existing nonproliferation programs to identify and prioritize vulnerable materials, remove or secure such materials, convert research and test reactors from HEU to LEU, and take any other steps necessary to meet changing threats. Much of NNSA's nonproliferation work is conducted abroad. Uncertainties in this operating environment impact the completion of NNSA's annual goals, most notably the construction of fossil fuel plants to eliminate weapons grade plutonium production in Russia, the construction of a MOX fuel facility in Russia, and installation of Second Line of Defense sites in Russia and other regions of concern.

During FY 2005, the NNSA:

- Shipped for launch preparation crucial technology developed by NNSA for the Defense Support Program (DSP) satellite. The purpose of the equipment is to monitor the Limited Test Ban Treaty of 1963 and to deter nations with nuclear weapons from conducting nuclear tests. NNSA delivered

seven of eight planned advanced technologies and operational systems (e.g. satellite payloads and seismic station calibration data sets) to improve the accuracy and sensitivity of nuclear weapons test monitoring. (NA GG 2.40.02)

- Completed about 26 percent of the refurbishment of a fossil fuel plant in Seversk, Russia. (NN GG 2.42.01) When complete, this plant – along with the construction of another plant in Zheleznogorsk, Russia – will provide an alternative fossil fuel power source permitting the shutdown of three nuclear reactors, which currently produce up to 1.2 metric tons of weapons-grade plutonium annually.
- Failed to meet the target to complete 100 percent of the detailed design, and to start site preparation, construction, and long-lead procurements for the Russian MOX facility. MOX facilities support nuclear nonproliferation by reducing the supply of fissile material. After the liability protocol is signed and the Russian Government completes its technical review, the United States, France and Russia will begin discussions on an agreement to transfer liability to Russia. (NA GG 2.47.05)
- Installed 87 SLD sites (including 4 Megaports). (NA GG 2.46.06) The NNSA provides assistance to foreign governments to identify and intercept illegal shipments of weapons materials by working in Russia and other regions of concern. Recent agreements with Slovenia and Ukraine will now provide the legal basis for allowing work to proceed in those countries.
- Completed approximately 87 percent of the detailed design of the PDCF; the target was 100 percent. (NA GG 2.47.01) Contractor estimates regarding the time required for detailed design were too optimistic. This facility will provide the U.S. with the capability to disassemble surplus nuclear weapons pits and convert the resulting plutonium metal to plutonium oxide, reducing the supply of fissile material.
- Engaged 7,775 Russian scientists and engineers formerly employed in nuclear weapons facilities located in Russia, and created or expanded 42 commercial enterprises. (NA GG 2.45.01-02) Employing skilled nuclear-trained professionals in endeavors such as medical technology helps prevent the spread of sensitive knowledge to rogue states.

➔ External Factors Related to General Goal 2

The following external factors could affect the Department's ability to achieve this goal:

- **Close Cooperation with Russia:** Unprecedented levels of cooperation between the United States and Russia have made possible great strides in securing and eliminating inventories of surplus materials. A close relationship is necessary for future progress.

- **International Atomic Energy Agency (IAEA):** The IAEA is essential to the success of our efforts to control nuclear proliferation. It is uncertain whether the IAEA will receive the necessary funding and show the necessary leadership to member countries. The NNSA is monitoring this situation closely.

- **Technology:** Technological development is uncertain and unpredictable. Our efforts to develop nuclear weapons/material detection technology may be more or less successful than predicted, which would have a corresponding positive or negative impact on our efforts.

■ General Goal 3: Naval Reactors

Provide the Navy with safe, militarily effective nuclear propulsion plants and ensure their continued safe and reliable operation.

Naval nuclear propulsion plants currently power about 40 percent of the Navy's principal combatants. The NNSA will continue to provide the Navy and the Department of Defense reliable and militarily effective nuclear power through the Naval Reactors program. New technologies, methods, and materials to support reactor plant design for future generations of reactors for submarines, aircraft carriers, and other combat ships are also developed under this program.



The nuclear-powered aircraft carrier, USS RONALD REAGAN (CVN 76), being welcomed for the first time in her new homeport, San Diego, California.

➔ How We Serve the Public

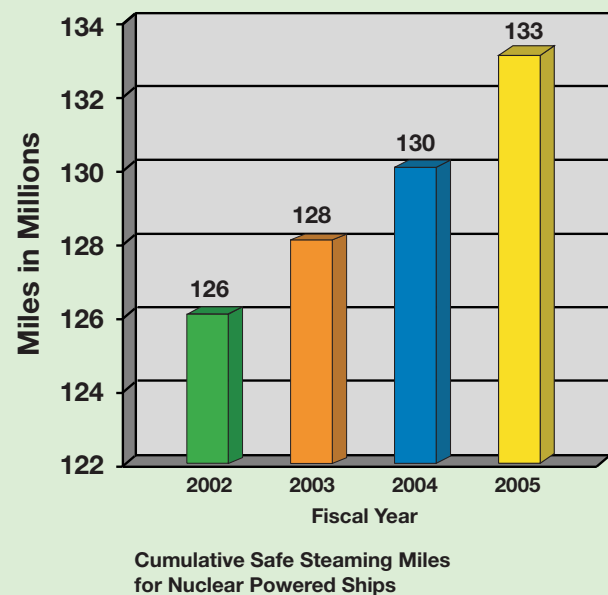
NNSA's Naval Reactors program serves the public by providing the Navy with safe, militarily effective nuclear propulsion plants and ensuring their continued safe and reliable operation. This program, which supports U.S. nuclear powered submarines and carriers around the world, remains a vital part of the national security mission and the Global War on Terrorism.

➔ Performance Against Key Targets

During FY 2005, the NNSA:

- Achieved more than 2 million miles of safe steaming in nuclear-powered ships and the design of new reactors. (NR GG 3.49.1) Since its inception, the Naval Reactors program has achieved over 133 million miles of safe nuclear propulsion, as shown in the chart below.

Safe Steaming Miles



- Completed 70 percent of the next generation aircraft carrier reactor design (referred to as the CVN 21). (NA GG 3.49.04) The CVN 21 nuclear propulsion plant will have increased core energy, nearly three times the electrical plant generating capacity, and will require half of the Reactor Department sailors, compared to today's operational aircraft carriers.

➔ External Factors Related to General Goal 3

Currently, no external factors appear to impact the ability to achieve this General Goal. However, given the unique nature of the Naval Reactor's responsibilities, commitments to both DOE and the Navy must be considered at all times. Therefore, any external factor seriously affecting either organization's policies may have an impact on the Program's ability to achieve this goal.

Energy

— INVESTING IN AMERICA'S ENERGY FUTURE —

To protect our national and economic security by promoting a diverse supply and delivery of reliable, affordable, and environmentally sound energy.

The demand for energy in the U.S. is rising much faster than the projected increase in domestic energy production. The shortfall between domestic energy demand and domestic supply is projected to increase nearly 50 percent by 2020. That projected shortfall can be made up in only three ways – import more energy, improve energy conservation and efficiency, and/or increase domestic supply.

The Administration considered these options in its development of the National Energy Policy (NEP). It concluded that increased dependence on oil imports from volatile regions of the world would jeopardize our national and economic security. As imports rise, so does our vulnerability to price shocks, shortages, and disruptions. For that reason, the Administration resolved to

take steps to improve energy conservation and efficiency, increase domestic energy production, and increase the reliability and security of imports in order to avoid increased dependence on imports from volatile regions of the world.

Largely consistent with the priorities set forth in the NEP, the President signed the Energy Policy Act into law in August 2005. This law is the first comprehensive energy plan in more than a decade. It encourages energy efficiency and conservation, promotes alternative and renewable energy sources, reduces our dependence on foreign sources of energy, increases domestic production, modernizes the electricity grid, and encourages the expansion of nuclear energy.

Energy Performance Scorecard (\$ in millions)

General Goal and Score	Program Costs		Program Goals and Scores		FY 2005 Budgetary Expenditures Incurred *				Performance of Annual Targets	
	FY 2005	FY 2004			Met (100%)	Not Met (> 40%)	Not Met (< 40%)	Undetermined	Met (> 40%)	Not Met (< 40%)
4. Energy Security	\$6,617	\$6,378	Hydrogen & Fuel Cell Technologies	Y	\$107	7	2	0	0	0
			Vehicle Technologies	Y	\$179	4	1	0	0	0
			Solar Energy	G	\$238	4	0	0	0	0
			Building Technologies	Y	\$72	7	1	1	0	0
			Wind Energy	Y	\$43	1	1	0	0	0
			Hydropower	G	\$6	2	0	0	0	0
			Geothermal Technology	G	\$34	2	0	0	0	0
			Biomass & Biorefinery Systems R&D	G	\$107	3	0	0	0	0
			Weatherization	G	\$283	2	0	0	0	0
			State Energy Programs	G	\$112	2	0	0	0	0
			Intergovernmental Activities	Y	\$27	5	2	0	0	0
			DEMP/FEMP	Y	\$21	4	0	1	0	0
			Distributed Energy Resources	Y	\$64	3	0	1	0	0
			Industrial Technologies	G	\$102	3	0	0	0	0
			Near Zero Atmospheric Emissions Coal-Based Electricity & Hydrogen Production	G	\$374	7	0	0	0	0
			Natural Gas Technologies	G	\$57	2	0	0	0	0
			Oil Technology	G	\$58	1	0	0	0	0
			Petroleum Reserves	G	\$251	1	0	0	0	0
			Develop New Nuclear Generation Technologies	G	\$156	6	0	0	0	0
			Maintain and Enhance National Nuclear Infrastructure	G	\$208	2	0	0	0	0
			Enhance the Nation's Nuclear Education Infrastructure Capability	G	\$25	1	0	0	0	0
			Electric Transmission & Distribution	Y	\$114	3	0	2	0	0
			Southeastern Power Administration	G	\$31	4	0	0	0	0
			Southwestern Power Administration	G	\$37	5	0	0	0	0
			Western Area Power Administration	G	\$623	5	0	0	0	0
			Bonneville Power Administration	G	\$4,974	4	0	0	0	0
			Energy Information Administration	G	\$87	3	0	0	0	0
Total Cost	\$6,617	\$6,378			\$8,390	93	7	5	0	0

* Includes capital expenditures but excludes such items as depreciation, changes in unfunded liability estimates and certain other non-fund costs, and allocations of Departmental administration activities.

Science and technology are the Department's principal tools for achieving the goals of the NEP and the Energy Policy Act. The Department invests in high-risk, high-value energy research and development (R&D) that the private sector alone would not or could not develop in a market-driven economy.

■ General Goal 4: Energy Security

Improve energy security by developing technologies that foster a diverse supply of reliable, affordable, and environmentally sound energy by providing for reliable delivery of energy, guarding against energy emergencies, exploring advanced technologies that make a fundamental improvement in our mix of energy options, and improving energy efficiency.

The programs supporting this General Goal follow through with the President's promise for a strong, secure economy, and an energy-independent future. Investments are being made that will benefit the Nation today and in the future, including expanding energy supplies, assessing and addressing energy infrastructure vulnerabilities, and developing energy assurance activities consistent with the NEP and Energy Policy Act.

The Department's technologies draw on all of the Nation's available resources: renewable energy sources (including hydropower, wind, solar, bioenergy, and geothermal), nuclear energy, oil, natural gas, coal, and reductions in demand through conservation and energy efficiency technologies and processes. The Administration believes it is not the role of the Federal Government to choose the energy sources for the country. Instead, its role is to help the private sector develop technologies capable of providing a diverse supply of energy, and to allow the market to decide how much of each energy source is actually used. Diversity of energy sources can help provide stability and guard against price spikes, helping to ensure the Nation's energy security.

■ Energy Efficiency and Renewable Energy

The Office of Energy Efficiency and Renewable Energy's (EE) mission is to strengthen America's energy security, environmental quality, and economic vitality through public-private partnerships with the private sector, state and local governments, DOE national laboratories, and universities. These partnerships seek to promote energy efficiency and productivity, bring clean, reliable and affordable energy technologies to the marketplace, and make a difference in the everyday lives of Americans by enhancing their energy choices and quality of life.

➔ How We Serve the Public

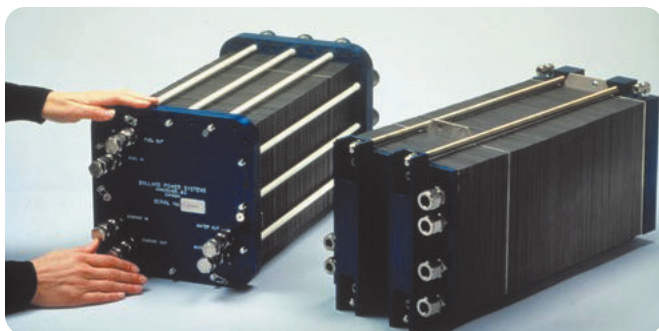
Renewable energy technologies hold tremendous promise in moving the Nation toward sustained, low emission electricity and hydrogen supply. Government-sponsored R&D efforts over recent decades have been very successful in



President George W. Bush at a Washington D.C. Shell Station, the first integrated gasoline/hydrogen station in North America. The Department's Hydrogen "Learning Demonstration," brings together automobile makers and energy companies to test fuel cell vehicles and hydrogen fueling systems in real-world conditions.

helped to lower costs and improve the reliability of renewable energy technologies, and more can be achieved with robust R&D in the future. EE's programs address both the supply and demand sides of the energy security equation by ensuring energy security in three general areas:

- **Replacement of Conventional Fuels** – The Vehicle Technology and Hydrogen programs work together through the FreedomCAR Partnership and Hydrogen Fuel Initiative to develop technologies that, over the next several decades, have the potential to virtually eliminate the use of petroleum for transportation. During FY 2005, two hydrogen refueling stations were opened: one in Washington, DC and the other in Chino, California. These demonstration projects address major technical and economic hurdles in renewable and distributed hydrogen production that must be overcome to make these technologies a reality.
- **Clean, Affordable Renewable Energy Sources** – The Solar Energy Technology R&D program works to provide clean, reliable, affordable solar electricity for the Nation through its research programs in photovoltaic (PV) energy systems. PV technology makes use of the abundant energy in the sun to convert sunlight directly into electricity for residential and commercial buildings, including power for lights and air conditioning. EE has continued to demonstrate greater increases in conversion efficiency, and is working to drive down production costs for PV modules.
- **Energy Efficiency and Conservation** – The Weatherization Assistance Program delivers weatherization services to low-income households in every county in the nation and on Native American Tribal lands. In addition, the Department is a proud champion of the Energy Star® program which is helping businesses and individuals protect the environment through superior energy efficiency. Last year alone we calculate that Americans, by purchasing Energy Star



A fuel cell uses the chemical energy of hydrogen to produce electricity and water, cleanly and efficiently.

products as opposed to less efficient alternatives, saved enough energy to power 20 million cars – all while saving \$10 billion. The Energy Star label raises awareness and encourages manufacturers to produce, and consumers to buy, energy efficient products.

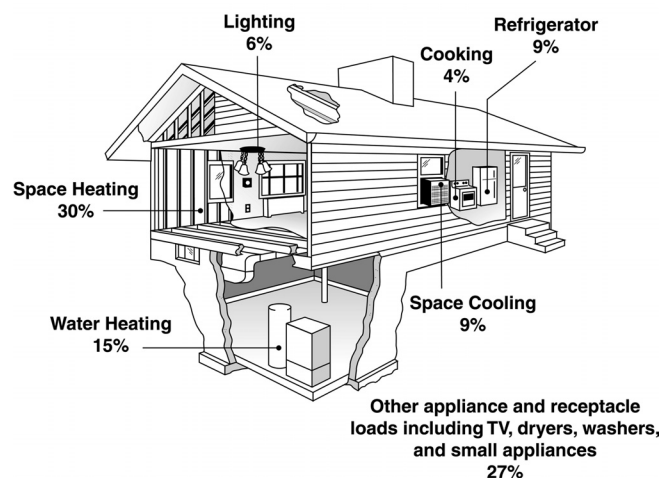
➔ Performance Against Key Targets

During FY 2005, EE:

- Achieved a cost-competitive energy level of \$125 per kilowatt for a hydrogen-fueled, 50 kilowatt fuel cell power system, meeting the annual target. (EE GG 4.01.11) The Hydrogen and Fuel Cell Technology program is conducting R&D to develop hydrogen production, storage, and delivery technologies to the point that they are cost and performance competitive and are being used by the Nation's transportation, energy, and power industries.
- Reduced to \$862.50 the cost of a high power, light vehicle lithium ion battery, exceeding the annual target of \$900. (EE GG 4.02.14) The Vehicle Technologies program goal is to develop cost and performance competitive technologies that enable cars and trucks to become highly efficient through improved hybrid power technologies, cleaner domestic fuels, and lightweight materials. Manufacturers and consumers will use these technologies to help the Nation reduce both energy use and greenhouse gas emissions, thus improving energy security by dramatically reducing dependence on oil.
- Verified, through laboratory testing, the conversion efficiencies of 13.7% for commercial production of crystalline silicon modules, meeting the annual target. (EE GG 4.03.02) Improving conversion efficiencies, which represents the percentage of light energy from the sun that is actually converted into electricity, while reducing development, production and installation costs to competitive levels, is critical for improving the performance of solar energy systems. This will accelerate large-scale usage across the Nation and make a significant contribution to a clean, reliable and flexible U.S. energy supply.
- Completed testing of the first full scale Low Wind Speed Technology prototype turbine and completed prototype

testing of a 1.8 kilowatt small wind turbine. Related targets for technology acceptance were not met; however, 21 states have attained 20 MW and 15 States have reached 100 MW of wind generation with 1 additional state expected in each category by the end of CY 2005. Broader deployment was delayed as a result of business decision uncertainty around continued federal tax policy and implementation of target state policies that create incentives for wind development. States with mature markets experienced near record annual construction of wind facilities. (EE GG 04.05.01) The Wind Energy Technologies program leads the Nation's R&D efforts to improve wind energy technologies that enhance domestic economic benefits. By 2012, the program goal is to complete technology R&D and collaborative efforts, and to provide technical support and outreach needed to overcome barriers – energy cost, energy market rules and infrastructure, and energy sector acceptance – to enable wind energy to compete with conventional fuels.

Energy Use in a Low-Income Household



Since 1999, DOE has been encouraging the network of weatherization providers to adopt the whole-house approach whereby they attack residential energy efficiency as a system rather than as a collection of unrelated pieces of equipment.

- Weatherized over 92,500 homes with DOE funds, and weatherized an additional 100,000 homes using leveraged funds (combination of DOE, state, and local funds), meeting the annual target. (EE GG 4.09.10) The Weatherization Assistance program improves the energy efficiency of the homes of low-income families through a network of more than 970 local Weatherization agencies throughout the country. During the last 28 years, the Department's Weatherization Assistance Program has provided services to more than 5.4 million low-income families. Weatherization of a home saves the homeowner an average of \$224 per year in utility costs.

Nuclear Energy, Science and Technology

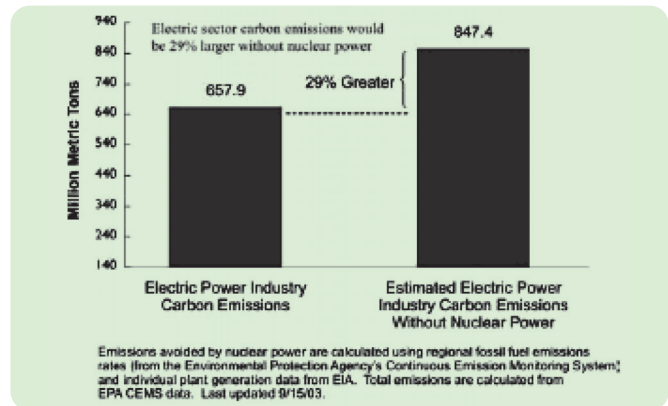
The Office of Nuclear Energy, Science and Technology (NE) leads the development of new nuclear energy generation technologies to meet energy and climate goals and advanced, proliferation-resistant nuclear fuel technologies that maximize energy from nuclear fuel, while maintaining and enhancing the national nuclear infrastructure.

➔ How We Serve the Public

NE focuses on both the present and future energy needs of the country through three general activities: (1) development of new nuclear technologies; (2) maintenance of NE's nuclear infrastructure; and (3) enhancing the nation's nuclear education infrastructure.

- Benefits realized from NE's R&D activities include the promotion of nuclear power generation in the United States, advances in waste treatment processes that yield reductions in the volume and long-term toxicity of high level waste from spent nuclear fuel, technologies developed to reduce the long-term proliferation threat posed by civilian inventories of plutonium in spent fuel, and provision of proliferation-resistant technologies to recover the energy content in spent nuclear fuel.
- Additional benefits include supporting university research and training reactors, assisting outstanding nuclear science and engineering students, bringing nuclear technology education to small, minority-serving institutions, and supporting university nuclear engineering research.

Nuclear Energy Environmental Benefit

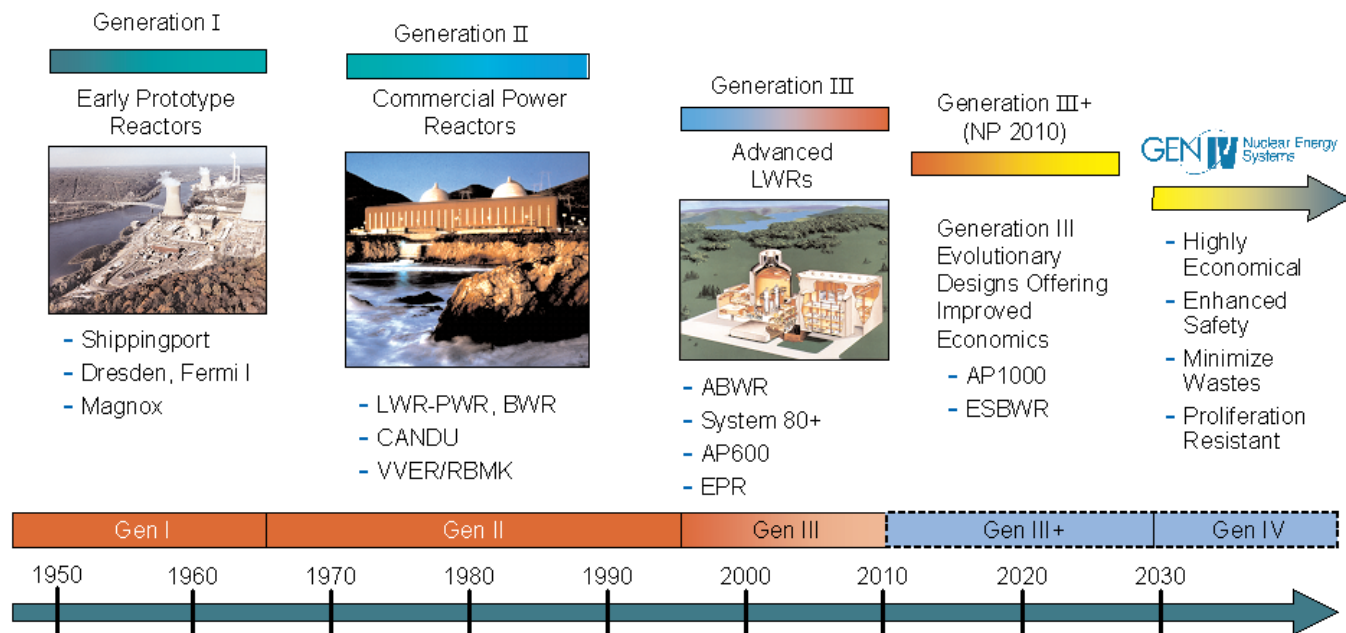


➔ Performance Against Key Targets

During FY 2005, NE:

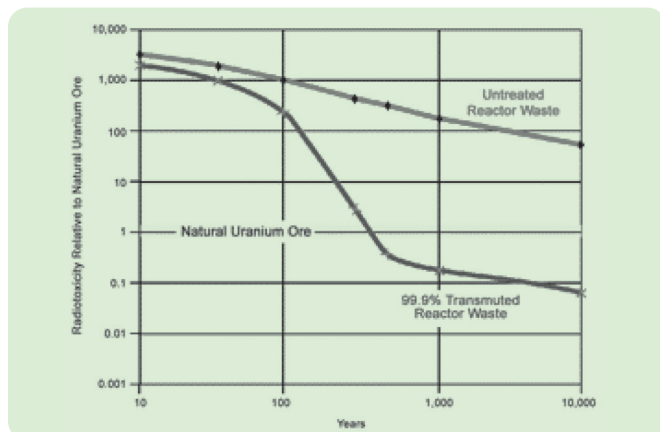
- Issued implementation plans for two Construction and Operating Licensing demonstration projects. (NE GG 4.14.02) These projects will focus on resolving by 2010 the technical, institutional, and regulatory barriers to the deployment of new nuclear power plants. This accomplishment will provide the nuclear power industry the information it needs in calculating the financial risks related to building the next nuclear power plant in the U.S. Additional nuclear power plants in the U.S. means no new additional greenhouse gases will be introduced into the atmosphere.

Nuclear Energy Technology Roadmap



Generations of nuclear energy systems - The first generation was advanced in the 1950s and 60s in the early prototype reactors. The second generation began in the 1970s in the large commercial power plants that are still operating today.

Advanced Fuel Cycle Initiative



With transmutation, used fuel reaches the toxicity of the source uranium ore within a few centuries.

- Completed, through laboratory-scale testing, separation of actinide elements (plutonium, neptunium, americium, and curium) from light water reactor spent fuel. (NE GG 4.14.6) By developing these extraction methods, both radioactive waste can be made less toxic and spent nuclear fuel can be recycled for energy. Currently, the spent nuclear fuel at nuclear plant sites contains the energy potential equivalent of 6 billion barrels of oil or about two full years of U.S. oil imports.
- Issued final design documents for the fuel capsule, and other critical components of the Advanced Gas Reactor fuel tests. (NE GG 4.14.3) This next generation reactor, also known as the Very High Temperature Reactor (VHTR), is designed to operate more efficiently than existing reactors and will have the potential to support production of large quantities of hydrogen. NE is leading multi-national research and development projects to develop advanced nuclear reactors through its Generation IV Nuclear Energy Systems Initiative. NE will continue to develop advanced reactor technologies to optimize the industry's future design options.
- Issued funding to the six existing Innovations in Nuclear Infrastructure and Education consortia; provided fuel to the University Research Reactors; issued 25 DOE/Industry matching grants; funded 21 equipment and instrumentation upgrades; funded 50 Nuclear Engineering Education Research grants; and provided 29 fellowships and 81 scholarships. (NE GG 04.63.01) These accomplishments work to reverse declining enrollments in nuclear science and engineering by helping to maintain domestic capabilities to conduct research and the critical infrastructure necessary to attract, educate, and train the next generation of scientists and engineers with expertise in nuclear energy technologies. The trend in declining enrollment has been reversed and is approaching the program goal of 1,500 students (considered the current optimal

enrollment level to meet the need for nuclear scientists and engineers). Additional nuclear scientists and engineers will be needed as retirements at national laboratories, government agencies, universities and industry increase in coming years.

Fossil Energy

The Office of Fossil Energy's (FE) activities are designed to ensure that the economic benefits from moderately priced fossil fuels are compatible with the public's expectation for exceptional environmental quality and reduced energy security risks.

➔ How We Serve the Public

- Fossil fuels are an important part of the U.S. and global energy mix. The Nation relies on fossil fuels for about 80 percent of the energy it consumes and EIA forecasts that this percentage will only decrease slightly in the future. The current U.S. fossil research portfolio is structured to provide a fully integrated program with mid- and long-term market entry offerings. The principal goal is to develop technologies for near zero atmospheric emissions, coal-based electricity generation plants that have the ability to co-produce low-cost hydrogen by 2015. The mid-term manifestation of that goal is expected to be the FutureGen project, a \$1 billion cost-shared venture with industry that will combine electricity and hydrogen production. This project will use a combination of efficiency improvements and carbon capture and storage to eliminate virtually all emissions of air pollutants, including sulfur dioxide, nitrogen oxides, mercury and CO₂. This prototype power plant will serve as the test bed for proving the most advanced technologies, such as hydrogen fuel cells.
- FE also advances a technology research and development program to resolve the environmental, supply, and reliability constraints of producing oil and natural gas resources. FE also maintains the Strategic Petroleum Reserve (SPR), which guards against the adverse economic impact of a major petroleum supply interruption to the United States, helping to ensure the Nation's energy security.



GE prototype for radial stacked planar solid oxide fuel cells.

➔ Performance Against Key Targets

During FY 2005, FE:

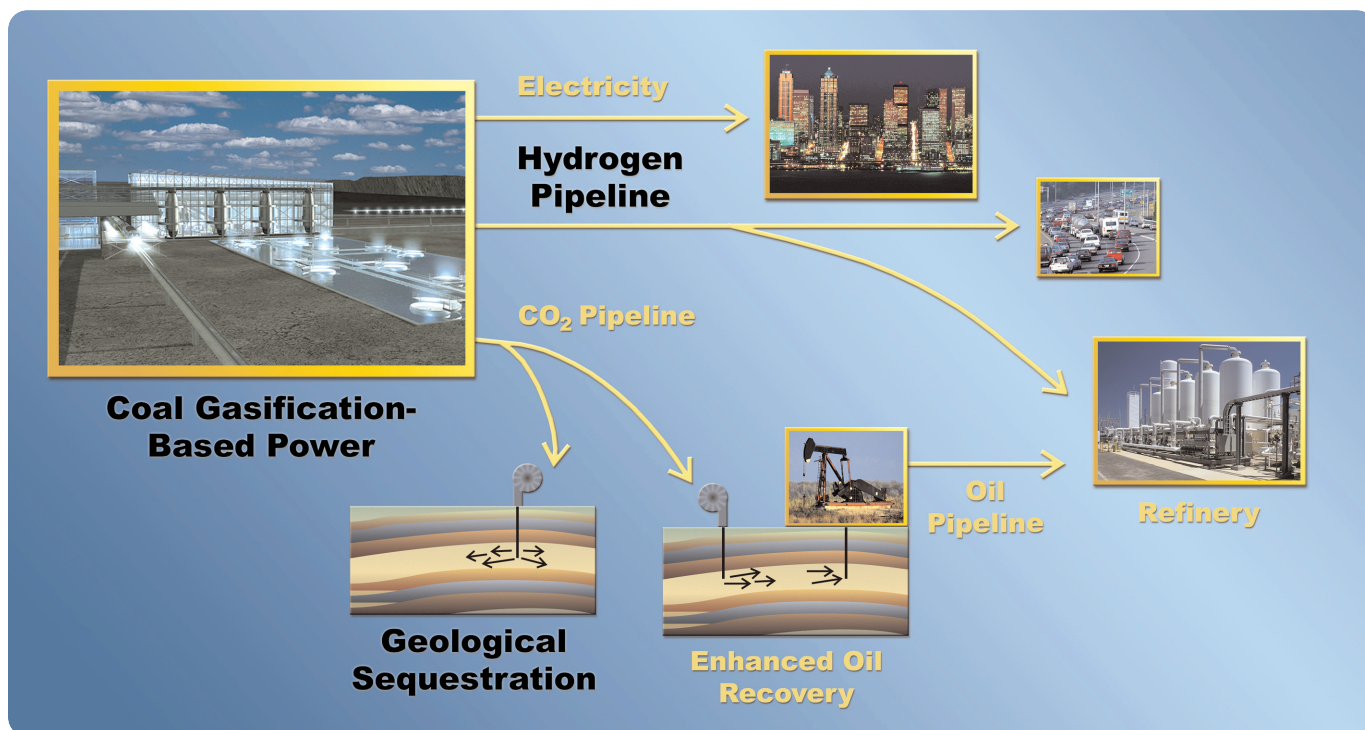
- Developed performance and cost data for emission control technologies and established, in support of proposed mercury and air quality regulations, a baseline for transport of emissions from coal-fired boilers. (FE GG 4.55.1) This is a critical step toward the goal of eliminating emissions of air pollutants through coal-based electricity production.
- Developed and validated improvements in sealing concepts, interconnects, and sulfur tolerance for solid oxide fuel cells under the SECA Core Technology Program. All three aspects provide R&D to meet SECA cost reduction and performance goals. GE Power Systems, one of six industrial teams working under the DOE SECA program, has developed a ten-cell radial stack of planar solid oxide fuel cells. The company incorporated the technology into its Phase I 5.4 kW prototype system – the first prototype SECA system to emerge from the program – and completed planned testing on September 30, 2005. (4.55.4.2)
- Developed, and tested in the Gulf of Mexico, new tools to retrieve and sample methane hydrates. (FE GG 4.56.2) Methane hydrates represent a large potential domestic resource that, if economic over the long-term, may provide an important supply of natural gas. With the information from these efforts, progress will be made toward understanding hydrate stability and the effects they may have on the global carbon cycle.

- Continued to develop novel, advanced technologies for coal gasification, focusing on ultra-clean, highly efficient processes, and reduced cost. (FE GG 4.55.2) Tests of a new, less expensive cleanup process showed sulfur and halide removal to be less than 60 ppbv and less than 10 ppbv, respectively. Less expensive oxygen production was also further developed through construction of a 5 ton per day ceramic membrane air separation unit. This oxygen production technology has the potential to reduce the cost of an IGCC plant by \$75/kWe and improve its thermal efficiency by greater than one efficiency point.

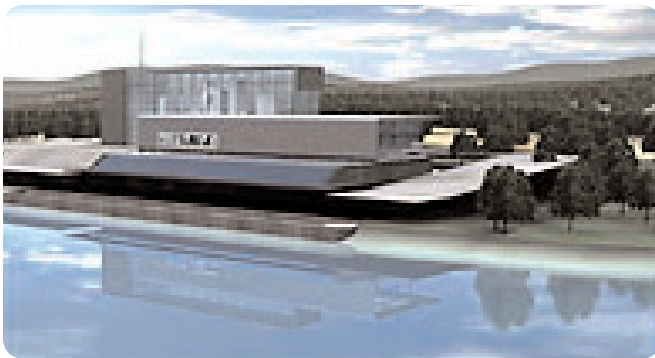


RTI's High Temperature Desulfurization System installed at the Eastman Chemical Company.

Coal-Based Energy Complex



- Achieved an SPR inventory of 700 million barrels in September, exceeding the annual target by 10 million barrels. By year-end the inventory was reduced to 693.2 million barrels as the first deliveries were made in response to energy emergencies caused by Hurricane Katrina. (FE GG 4.58.1) For SPR, energy security assurance is measured by (1) how quickly the program can respond to a Presidential direction to draw down; (2) how much of the oil inventory is available; and (3) the cost efficiency of operations. The key program goal, which was achieved for FY 2005, is to maintain operational readiness to draw down at a sustained rate of 4.4 million barrels per day for 90 days, within 15 days notice by the President.



Artist's Rendering of world's first coal-based, near zero atmospheric emissions electricity and hydrogen power plant.

■ Electricity Delivery and Energy Reliability

The Office of Electricity Delivery and Energy Reliability (OE) leads national efforts to modernize the electric grid, enhance security and reliability of the energy infrastructure, and facilitate recovery from disruptions to the energy supply. OE performs critical functions, which directly support the Department's Energy Security General Goal 4, by working with industry, state and local governments, national laboratories and other entities, to: (1) develop advanced technologies and approaches that improve the reliability of energy delivery; (2) guard against energy emergencies; and (3) improve energy efficiency.

➔ How We Serve the Public

- OE's programmatic activities directly benefit the public in several areas. In the field of R&D, OE works with national labs, private industry, and university and research institutions to develop technologies that will facilitate the modernization of the Nation's electricity delivery system. OE also analyzes the condition and operation of the energy infrastructure to identify critical transmission bottlenecks, chokepoints, market failures and other issues that are barriers to modernizing and upgrading the national grid. Finally, the office coordinates the Department's response to energy emergencies, helps protect against terrorist attacks on the energy infrastructure, and assists all levels of government and the private sector recover from energy supply disruptions. Most recently, OE served as

the Department's lead office with its deployment of staff for emergency response and energy restoration work in the aftermath of hurricanes Katrina and Rita.

➔ Performance Against Key Targets

During FY 2005, OE:

- Completed preparations to manufacture a 200m superconducting cable for American Electric Power (AEP) during FY 2005; however, due to a manufacturing delay, the superconducting cable was not completed until the first quarter of FY 2006. (OE GG 4.12.01) The successful development of high temperature superconducting cable will improve the efficiency and reliability of electricity transmission, such as reducing costs of increasing power delivery and relieving bottlenecks in transmission and distribution networks.
- Installed four additional data concentrators at four different data archiving and analysis locations, achieving a prototype wide area measurement system in the Nation's Eastern Interconnect. (OETD GG 4.12.02). As this wide area system is further developed, it will provide the ability to assess critical real-time grid activity and, in turn, more adequately address disturbances before they result in brown-out or black-out situations.

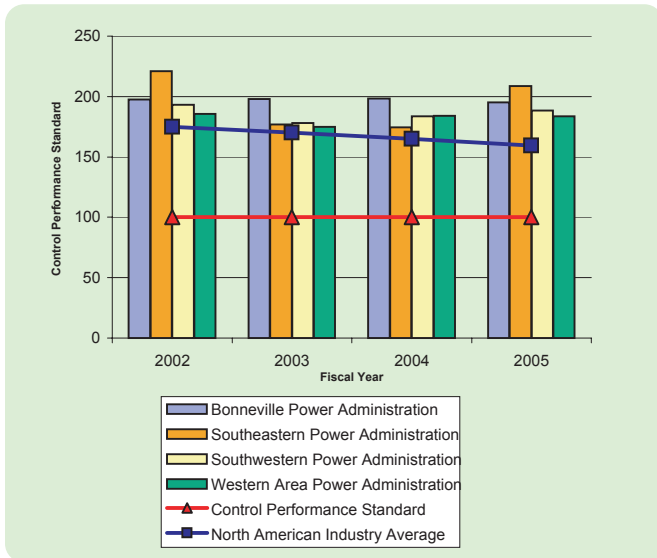
■ Power Marketing Administrations

The Reclamation Project Act of 1939, the Flood Control Act of 1944, and other acts direct the Department's Southeastern, Southwestern, and Western Area Power Administrations to market and deliver the power produced at Federal dams to not-for-profit utilities at the lowest possible rates to consumers, consistent with sound business practices. The self-financed Bonneville Power Administration, operating under the Bonneville Project Act of 1937, the Transmission System Act of 1974, the Northwest Power Act of 1980 and other statutes, markets and delivers federal and non-federal power to meet its statutory and contractual obligations to its customers, including providing the net firm power requirements of its requesting customer utilities.

➔ How We Serve the Public

- The Power Marketing Administrations (PMA) market and deliver reliable, cost-based Federal hydroelectric power and related services to customers over much of the southeastern, central and western United States. Transmission systems owned by the PMAs are part of the Nation's interconnected generation and transmission system and make a significant contribution to the country's past and future energy supply. While they assure that customers receive the benefits of Federal power, the PMAs also collect sufficient revenue to repay, within timeframes established by law and regulations, the American taxpayer's investments in such power generation and transmission systems. Each PMA implements

Control Performance Standard



individual power marketing programs based on regional hydropower sources and other factors inherent to their specific region of the country. By marketing and delivering Federal hydropower, the PMAs foster a diverse supply of reliable, affordable, and environmentally-sound energy while increasing the Nation's mix of energy options.

➔ Performance Against Key Targets

In FY 2005, the PMAs:

- Met each of their targets for system reliability, respectively, in accordance with key Control Performance Standards developed by the North American Electric Reliability Council (NERC). (PMA GG 4.51.1, 4.52.1, 4.53.1, 4.54.1) For many years the PMAs have measured their system reliability in accordance with NERC Control Performance Standards 1 and 2. As can be seen from the figure above, not only have they achieved acceptable ratings, they have exceeded the electrical utility industry average in each of the years shown.
- Met each of their respective targets for repayment of Federal power investment to the U.S. Treasury. (PMA GG 4.51.3, 4.52.3, 4.53.5, and 4.54.2) Meeting these targets demonstrates the PMAs commitment to meeting their obligations to U.S. taxpayers.

■ Energy Information Administration

The Energy Information Administration (EIA) provides reliable, timely and policy-neutral energy information, analysis and forecasts to its wide customer base. This customer base includes the Administration, Congress, Federal and State policymakers and agencies, the private sector, and International agencies.

➔ How We Serve the Public

- EIA's contributions are critical for promoting sound energy decision-making and efficient energy market operations, as well as fostering general public understanding. These contributions subsequently drive the supply and delivery of reliable, affordable and environmentally sound energy, both now and in the future. There has been an increasing reliance on EIA's data and analyses to help understand and respond to current and emerging changes in various energy sectors. These changes result from actions such as energy industry restructurings, demographic changes, new fuel standards, and legislative initiatives. For example, EIA provided Congress numerous analyses to assist in its development of the Energy Policy Act of 2005.

➔ Performance Against Key Targets

During FY 2005, EIA:

- Achieved at least a "satisfied" rating from 90 percent of customers surveyed about the quality of EIA information, meeting the annual customer satisfaction target. (EIA GG 4.61.02) EIA maintains this effectiveness through regular monitoring of customer satisfaction, something it has been doing for the past ten years.

➔ External Factors Related to General Goal 4

The following external factors could affect our ability to achieve this goal:

- **Technology:** Technological development is inherently unpredictable. Our efforts to develop near zero atmospheric emission fossil generation technology, hydrogen, renewable energy, advanced nuclear power and fusion may be more or less successful than predicted, with a correspondingly positive or negative impact on our efforts.
- **Market Forces:** Whether new technology is deployed depends to a large extent on whether that technology is competitive, considering relevant policies (e.g., tax incentives for the purchase of fuel-cell vehicles).
- **Consumer Choice:** Improved energy efficiency is largely the result of millions of decisions by individual consumers. The Department can help develop improved technology, but whether this technology is deployed depends on consumer decisions and relevant policies that may affect those decisions. In addition, the deployment of hydrogen and alternative fueled vehicles depends to a large extent on the decisions by individual consumers to purchase these vehicles.
- **Nonproliferation Policy:** Deployment of advanced fuel technologies will depend upon policy changes permitting fuel reprocessing.

Science

— ADVANCING SCIENTIFIC UNDERSTANDING —

To protect our national and economic security by providing world-class scientific research capacity and advancing scientific knowledge.

Progress in fields such as biomedical engineering, telecommunications, supercomputing, and many others rely upon progress in the physical sciences. The Nation's investments in forefront basic research in the physical sciences are made primarily through the Department's Office of Science (SC). SC supports 43 percent of funding for basic research in the physical sciences in the U.S., underpinning our Nation's energy security.

The mission of SC is to deliver the discoveries and scientific tools that transform our understanding of energy and matter and advance the national, economic, and energy security of the United States.

In support of its mission, SC supports 10 national laboratories and 27 major scientific facilities, including neutron and x-ray light sources, supercomputing centers, fusion experiments, and particle accelerators. In FY 2005, over 19,000 scientists from universities, industry, and government will use these facilities to make tremendous advances in U.S. science and technology.

■ General Goal 5: World-Class Scientific Research Capacity

Provide world-class scientific research capacity needed to ensure the success of Department missions in national and energy security; to advance the frontiers of knowledge in physical sciences and areas of biological, medical, environmental, and computational sciences; or to provide world-class research facilities for the Nation's science enterprise.

"...making plans and checking performance against them requires a lot of time and energy – not to mention thought – and changing your ideas about how things should be done encounters huge psychological resistance. Good management and good science are neither intuitive nor easy. Science requires background knowledge to make useful plans or hypotheses; it requires discipline to execute work or experiments that conform to the plan; it requires patience and attention to detail to observe and document the results; and it requires a combination of humility and creativity to abandon preconceptions and forge a new path forward."

- John Marburger III
Director, Office of Science and Technology Policy
Executive Office of the President
March 23, 2005

The common thread woven through all of the Department's activities is science – basic research underpins the Department's applied technology programs through strategic investments that fuel discoveries in materials sciences, chemistry, plasma science, plant sciences, biology, computation and environmental studies. SC plays five key roles in the U.S. research enterprise:

- Supports the missions of the Department, delivering the scientific knowledge for solutions to our Nation's most critical energy and environmental challenges

Science Performance Scorecard (\$ in millions)

General Goal and Score	Program Costs		Program Goals and Scores		FY 2005 Budgetary Expenditures Incurred*					Performance of Annual Targets	
	FY 2005	FY 2004			Met (100%)	Not Met (≥ 80%)	Not Met (< 80%)	Not Met (< 80%)	Undetermined		
5. World-Class Scientific Research Capacity	\$3,565	\$3,196	High Energy Physics	Y	\$783	3	0	1	0		
			Nuclear Physics	G	\$463	4	0	0	0		
			Biological and Environmental Research	Y	\$758	6	0	1	0		
			Basic Energy Sciences	G	\$1,333	5	0	0	0		
			Advanced Scientific Computing Research	G	\$287	3	0	0	0		
			Fusion Energy Sciences	G	\$288	4	0	0	0		
Total Cost	\$3,565	\$3,196			\$3,912	25	0	2	0		

* Includes capital expenditures but excludes such items as depreciation, changes in unfunded liability estimates and certain other non-fund costs, and allocations of Departmental administration activities.

- Serves as the Nation's leading supporter of the physical sciences, which includes physics, chemistry and materials science
- Serves as the stewards of world-class scientific tools – building and operating major research facilities for use by the world's scientific community
- Serves as a leading Federal agency for the creation of leadership class computational facilities for open science, enabling solutions to problems in science and industry not attainable by simple extrapolation of existing architectures
- Supports a diverse set of researchers, including those at more than 280 universities in nearly every state in the Nation, scientists and technicians at the DOE national laboratories and in industry.

“The purposes of science are the advancement of knowledge and the freedom and happiness of man.”

- Thomas Jefferson

The Department's investment in the most basic areas of research spark the imagination and advance human curiosity about the universe in which we live. Historically, these investments have also paid handsome dividends in terms of new technologies that have raised the standard of living and even extended life expectancies. Examples include cell phones, satellite TV, magnetic resonance imaging (MRI), lasers (for levels, CD players, or eye surgery), the World Wide Web, and the ubiquitous computers that seem to dominate the world today. While it is unknown what technologies will ultimately result from today's investments in basic research at DOE, we welcome the opportunity to share the excitement and wonder of our continuing journey of discovery.

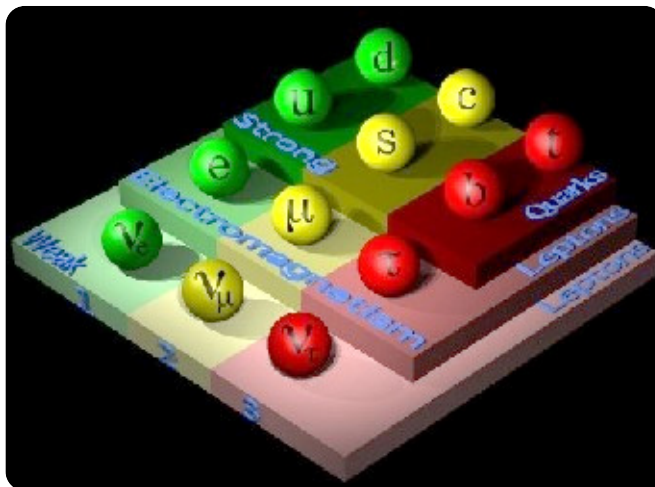
■ High Energy Physics

➔ How We Serve the Public

Since the beginning, man has yearned to discover our world's building blocks and to know how our universe began: from the “earth, air, fire, and water” of our ancestors to the fundamental subatomic particles of today, each generation has advanced our understanding of the makeup of the universe. With revolutionary new technical tools, the last half-century has seen amazing new discoveries at an ever-increasing rate. In the World Year of Physics, the 100th anniversary of Einstein's Theory of Relativity, we find ourselves ready to discover a new universe beyond Einstein's dreams.

In the early 20th Century, we learned that the universe is expanding, found that space-time is curved, and discovered the quantum nature of matter. Over the last 30 years we also learned that just 12 types of particles, interacting by four

basic forces, make up all matter— a description of nature that has been verified by so many precision measurements that it is known as the Standard Model.



Physicists call the theoretical framework that describes the interactions between elementary building blocks (quarks and leptons) and the force carriers (bosons) the Standard Model. These interactions determine the physical nature of the entire universe.

One of the great mysteries of science is how the universe originated and evolved. Experiments at the High Energy Physics' (HEP) accelerators seek evidence for “unification”: the melding of today's diverse patterns of particles and interactions into a much simpler picture at high particle energies, like those that prevailed in the very early universe.

In FY 2005, HEP:

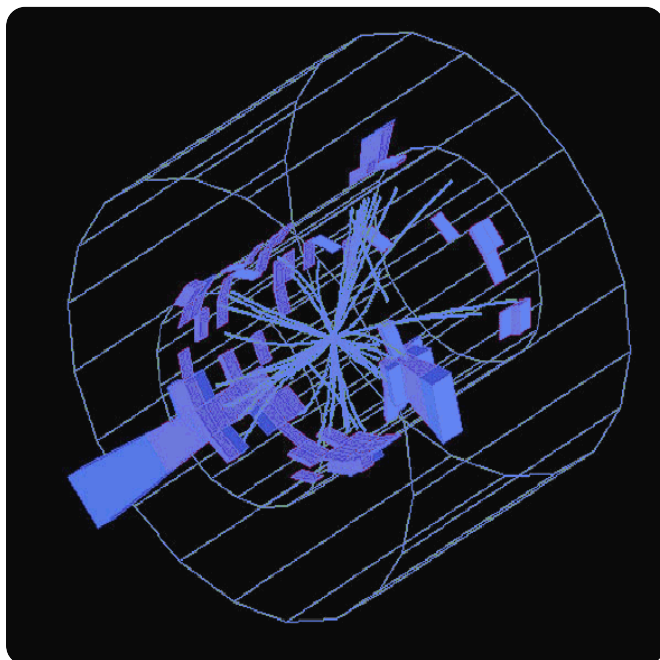
- Supported about 2,400 researchers studying elementary constituents of matter and their interactions, and their connections to birth and development of the cosmos.
- Operated accelerator facilities at the Fermi National Accelerator Laboratory (FNAL) and the Stanford Linear Accelerator Center (SLAC), and is helping to construct a new accelerator at the CERN laboratory in Europe.
- Planned future efforts, such as an International Linear Collider that will extend the energy frontier and a joint experiment with NASA for a space-based telescope that will extend our knowledge of dark energy ten billion years into the past. New experiments will begin to unravel the mysterious properties of the neutrinos.

➔ Performance Against Key Targets

Using facilities located at FNAL, in FY 2005 HEP:

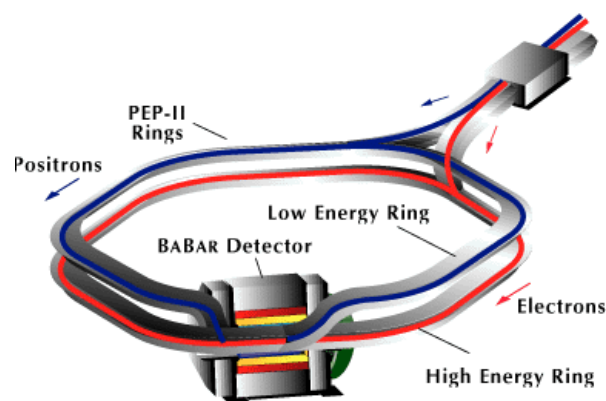
- Delivered integrated data to the CDF and D-Zero detectors at the Tevatron within 20 percent of its FY 2005 baseline (312 inverse picobarns). (SC GG 5.19.1) HEP researchers are using this facility to search for the elusive “Higgs” field

which is believed to be the source of mass in the universe (see insert). This search has been a significant HEP activity at FNAL for the past several years. This and related activities may reveal undiscovered principles of nature that will reshape our view of the universe.



Simulation of a Higgs boson event as it might appear in a detector at Fermilab. Discovering the Higgs boson would demonstrate the existence of the Higgs field and would profoundly affect our understanding of the universe. Likewise if the Higgs boson were found not to exist, it would be a major blow to the Standard Model.

- Delivered integrated data to the BABAR detector at the SLAC B-Factory (SC GG 5.19.2) Determining how the imbalance between matter and anti-matter occurred, and why matter and antimatter did not cancel one another at the start of the universe, resulting in nothingness, is another objective of HEP research, called charge parity (CP) violation. Efforts at the SLAC focus on CP violation. Unfortunately this work was interrupted by a safety accident which shut down SLAC for almost half the fiscal year. The facility restarted in mid-April 2005. Despite this setback, performance was within 20% of the FY 2005 baseline (40 fb⁻¹) (SC GG 5.19.02)
- Operated its user facilities to meet the needs of the research community. These national user facilities are generally operated on a near-optimal schedule, where the accelerators are down only for scheduled maintenance, upgrades and necessary machine performance studies. In FY 2005, due to the SLAC safety shutdown, the average operating time at HEP scientific user facilities was 73 percent of scheduled operating time, falling short of the FY 2005 target of 80 percent. (SC GG 5.19.04)

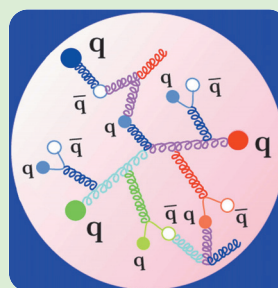


■ Nuclear Physics

➔ How We Serve the Public

Nuclear matter makes up most of the mass of our planet and its inhabitants. Nuclear Physics (NP) research involves understanding nuclear matter, from the smallest building blocks, quarks and gluons, to the stable elements in the Universe created by stars; to unique isotopes created in the laboratory that exist at the limits of stability and possess radically different properties from known matter; to the mysterious and important neutrino.

- In the first half of the 20th Century, great progress was made in the understanding of nuclei and nuclear reactions, leading to the discovery of fission and fusion and the development of the large field of nuclear medicine.
- Research in the last few decades resulted in the development of the strong nuclear interaction theory called Quantum Chromodynamics Theory (QCD – see insert) which allows scientists to explain matter in terms of the interactions between quark and gluon particles.



The strong nuclear force is responsible for binding quarks together to form protons and neutrons, and the residual effects also bind these neutrons and protons together in the nucleus of the atom.

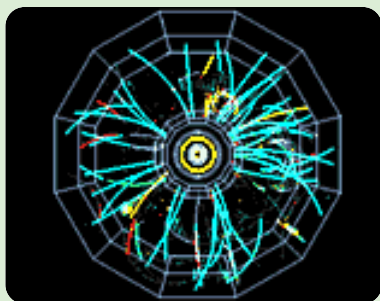
The strong interaction acts between two quarks by exchanging particles called gluons. The strong interaction has a very limited range – not much farther than the radius of a proton. It also has a strange effect – as the distance between two quarks increases, the amount of energy in the force between them increases. If the force becomes strong enough, there is enough energy to create new quarks.

- During FY 2005, the NP Program focused much of its research in several locations—Argonne National Laboratory (Argonne Tandem Linac Accelerator System-ATLAS), Oak Ridge National Laboratory (Holifield Radioactive Ion Beam Facilities-HRIBF), Thomas Jefferson National Accelerator Facility (Continuous Electron Beam Accelerator Facility-CEBAF), and Brookhaven National Laboratory (Relativistic Heavy Ion Collider-RHIC).

➔ Performance Against Key Targets

In FY 2005, NP:

- Achieved targeted number of events (within 30 percent of the baseline estimate) through experiments at RHIC facilities (SC GG 5.20.3) These experiments allow scientists to study heavy-ion collision events that create new forms of hot, dense nuclear matter and to probe their properties. The quark and gluon constituents of protons and neutrons are confined inside nucleons except in one circumstance – if the nuclear matter is heated sufficiently, quarks will be released and protons and neutrons will melt into a superheated, dense plasma of quarks and gluons. The same kind of plasma is believed to have filled the universe about a fraction of a second after the “Big Bang.”



An end view of collision between deuterons and gold ions captured by the STAR detector at Brookhaven's Relativistic Heavy Ion Collider (RHIC).

- Achieved an average operating time at NP scientific user facilities of greater than 80 percent of scheduled operating time, meeting the FY 2005 target. (SC GG 5.20.4) To meet the needs of the research community, these national user facilities are optimally operated.

■ Biological and Environmental Research

➔ How We Serve the Public

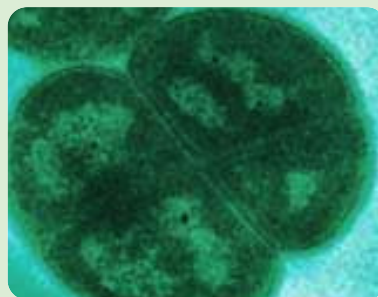
Advances in biology, spurred by achievements in genomic research and the sequencing of the human genome, bring new and ground-breaking solutions to some of the most elusive biological and environmental challenges. A key challenge is to learn how to turn microbes into engines of scientific progress. Some microbes thrive in extreme environments such as high-level radioactive waste tanks and could be used to help clean up those wastes, while others act as “mini-factories” producing energy such as ethanol or

hydrogen that could be harvested. The Biological and Environmental Research (BER) program supports research to understand how microbes can be used to help clean up chemical and radioactive pollutants and to produce energy. BER also supports research to understand and predict changes in global climate; non-biological research into the nature, extent and remediation of toxic and high-level radioactive wastes; and medical sciences research to develop new radioisotope-based diagnostic and treatment tools and bioengineering solutions to critical medical problems. As scientists begin to understand and develop the capabilities to manipulate matter at the micro-, nano-, and molecular-scales, such understanding will allow us to model and predict biological and environmental interactions on a regional and global basis, leading to new approaches to energy production, environmental management, and medical diagnosis and treatment. Such research is in support of the National Energy Policy.

➔ Performance Against Key Targets

In FY 2005, BER:

- Conducted two sets of field experiments to evaluate the microbe-based immobilization of chromium and uranium through biological reduction to understand and control the long term fate and transport of these contaminants in the field. (SC GG 5.21.1) DOE's past weapons activities have left environmental cleanup challenges across the country. With current technology it is simply not physically or economically practical to completely stabilize or remove all contaminants from these sites. Native microbes have a remarkable capacity to thrive in highly contaminated waste sites and to use toxic wastes as sources of energy. New, science-based strategies, including microbial strategies, for contaminant stabilization could provide a cost effective tool for waste site cleanup and stewardship. At present, we are just beginning to understand the structure and function of native microbial communities, including their biochemical capabilities and mechanisms that regulate those processes. Microbial research in BER looks at the most basic

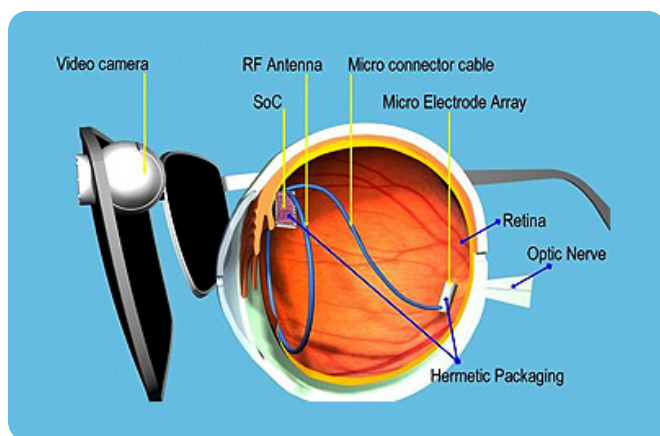


Electron photomicrograph of a typical four cell cluster of *D. radiodurans* (sequenced in the DOE Genomics Program).

The radiation resistant bacterium *Deinococcus radiodurans* may be useful in the cleanup of highly radioactive wastes.

molecular-level processes of nature, offering tremendous promise for a safer, stronger, healthier and more secure world.

- Implemented three separate component submodels (interactive carbon cycle, secondary sulfur aerosol, and interactive terrestrial biosphere) within a climate model to conduct 3-to 4-year duration climate simulations. (SC GG 5.21.3) Advanced climate models are needed to describe and predict the roles of oceans, the atmosphere; sea, ice, and land masses in climate change; and the role of clouds in controlling solar and terrestrial radiation to and away from the earth. BER funded scientists study the impacts of excess carbon dioxide in the atmosphere from human sources (including energy use) on Earth's climate and ecosystems, and develop possible mitigation strategies for stabilizing atmospheric carbon dioxide levels. BER research addresses the challenge of helping to formulate domestic and international energy policy in response to environmental change, and defines DOE's role in the U.S. Global Change Research Program, the Climate Change Research Initiative, and the Climate Change Science Program.
- Completed fabrication of a 60 microelectrode array for use as an artificial retina; however, Food and Drug Administration (FDA) approval to implant the prototype into blind patients is pending. Approval is expected in the second quarter of FY 2006. (SC GG 5.21.07) This project is an example of research at the juncture of the physical and biological sciences that promises remarkable technology for tomorrow's medicine. Already, developments in imaging technology by BER supported scientists have resulted in dramatic improvements in nuclear medicine. BER research



An artificial retinal implant consists of a chip implanted in the eye that receives image data transmitted over a wireless connection from the high-tech glasses. Patients wear glasses with a tiny camera on the frame. The camera captures images and sends the data to a microprocessor (concealed in the side of the glasses), which converts the data to an electronic signal. The signal is sent to a receiver in the eye and then travels along a tiny wire to the retinal implant. The signal causes the implant to stimulate the eye's remaining retinal cells which send the image along the optic nerve to the brain.

and technology development is improving medical diagnostic and therapeutic tools for disease diagnosis and treatment, noninvasive medical imaging, and biomedical engineering, such as the development of biomimetic devices like the artificial retina that will help the blind to see.

■ Basic Energy Sciences

➔ How We Serve the Public

Advances in the materials and chemical sciences, such as new magnetic materials; high strength, lightweight alloys and composites; novel electronic materials; and new catalysts, improved a number of energy technology applications to produce energy more efficiently and with less environmental impact. These advances are possible because of basic research in the physical sciences.

In nanoscale science research, it has been found that the properties of materials are dramatically different from their macro scale properties. Tiny structures of just a few atoms and molecules may be assembled into useful devices such as computers that can store trillions of bits of information. Complex structures may be designed, one atom at a time, to enhance certain traits such as super-lightweight and ultra-strong materials. Basic Energy Sciences (BES) is a leader in this revolution with nanoscale research in materials sciences, physics, chemistry, biology, and engineering, and BES can develop tools to probe and manipulate matter at the nano scale.

BES researchers have also observed and manipulated matter from the molecular scale to large assemblies of interacting components. Scientific discoveries in basic energy sciences will accelerate progress toward more efficient, affordable, and cleaner energy technologies.

The ability to observe, characterize, manipulate, and computationally model matter at the atomic or molecular scale determines the answers to such questions. BES capabilities that enable this research include state-of-the-art light sources, nanoscale science research centers, electron beam microcharacterization centers, high flux neutron sources, and a combustion research facility. These scientific facilities are located at the Stanford Linear Accelerator Center, Lawrence Berkeley National Laboratory, Oak Ridge National Laboratory, Argonne National Laboratory, Brookhaven National Laboratory, Sandia National Laboratories, Los Alamos National Laboratory, and the University of Illinois.

➔ Performance Against Key Targets

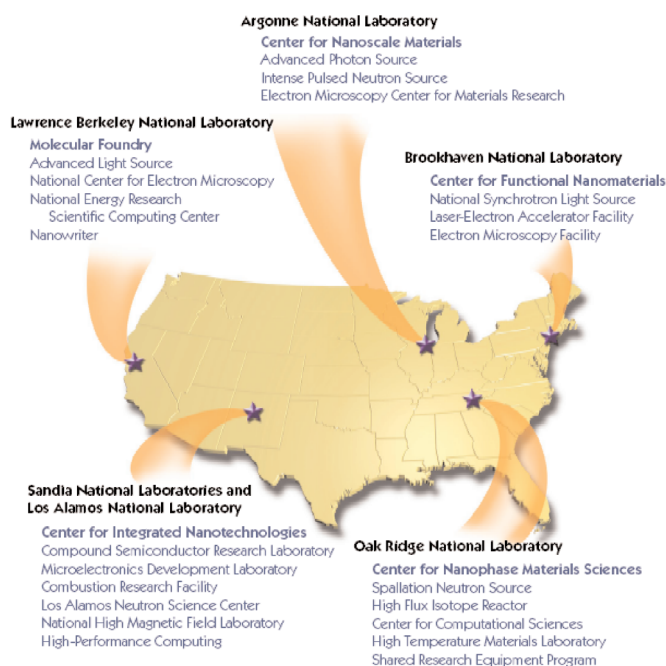
In FY 2005, BES:

- Demonstrated improvements in temporal and spatial resolution capabilities. (SC 5.22.1 and 5.22.2) Nanomaterials offer the possibility of revolutionary advances in materials properties and behaviors. For this

reason, research at the nanoscale is critical to these challenges. Four thrust areas are: (1) attain a fundamental scientific understanding of nanoscale phenomena, particularly collective phenomena; (2) achieve the ability to design and synthesize materials at the atomic level to produce materials with desired properties and functions; (3) take full advantage of major user facilities, and (4) develop experimental characterization techniques and theory/modeling /simulation tools necessary to drive the nanoscale revolution. Improving temporal and spatial resolution is critical to achieving these goals.

- Achieved an average operating time at BES's seven scientific user facilities of greater than 90 percent of scheduled operating time (SC GG 5.22.5), and met cost and schedule baseline targets for major construction, upgrade, or equipment procurement projects (SC GG 5.22.4). Along with supporting the near maximum operating levels of user facilities, BES is focused on the design, fabrication, and construction of new facilities to characterize and ultimately control materials. One of these, the Spallation Neutron Source (SNS), will be the world's most powerful neutron scattering facility when completed in FY 2006.

BES Nanoscale Science Research Centers



The Nanoscale Science Research Centers (NSRCs) supported by Basic Energy Sciences will be research facilities for the synthesis, processing, and fabrication of nanoscale materials. They will be co-located with existing user facilities to provide sophisticated characterization and analysis capabilities. In addition, NSRCs will provide specialized equipment and support staff not readily available to the research community. NSRCs will be operated as user facilities and be available to all researchers.

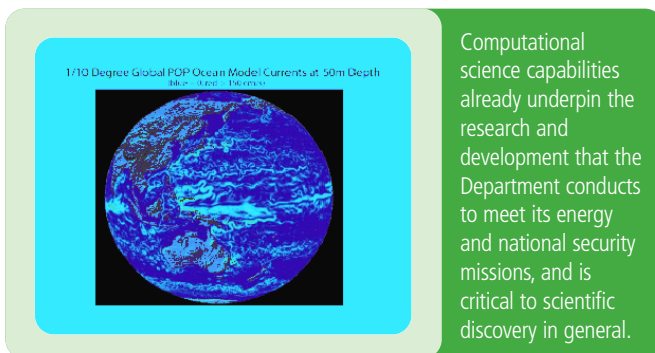


Aerial photograph of the nearly completed SNS in Oak Ridge, Tennessee. The typical size of an atom is tenths of a nanometer, and the laws of physics limit the resolution (i.e., the smallest features that can be seen) of visible light microscopes to features roughly a few hundred nanometers in size. Thus, instruments with resolutions one thousand times better than the best visible light microscopes are required to see atoms. To see atoms, we must use probes that are themselves as small as the atoms under investigation. Three such probes are: x-rays, electrons, and neutrons. Each has become the basis for major scientific user facilities in materials research and related disciplines. The BES synchrotron radiation light sources, electron-beam microcharacterization centers, and neutron scattering facilities are revealing the atomic world.

■ Advanced Scientific Computing Research

➔ How We Serve the Public

The understanding of basic processes, such as fluid flow and molecular structure, increases with computational modeling capability. Predicting the behavior of complex systems through computer-based simulation is the goal of Advanced Scientific Computing Research (ASCR). Through modeling and simulation, one can explore the interior of stars, learn how protein machines work within living cells, and make unique catalysts and high-efficiency engines.



- ASCR creates world-class, high performance computational networking tools that support the science, energy, environmental remediation, and national security missions of the Department. ASCR also supports basic research in many fields, including applied mathematics, computer science, advanced networks and software and partners with other programs in SC to support research in fields such as

structural biology; superconductor technology; applied mathematics, medical research and technology development; materials, chemical and plasma sciences; high energy and nuclear physics; and environmental and atmospheric research.

- ASCR plays a major role in the SC-wide Scientific Discovery through Advanced Computing (SciDAC) program, which aims to use computer simulations to develop scientific advances that were impossible using theoretical or laboratory studies alone and which will support SC programs. SciDAC has already produced advances in climate modeling and prediction, plasma physics, particle physics, accelerator design, astrophysics, chemically reacting flows and computational nanoscience.
- Scientists ponder numerous questions that can only be addressed through advances in scientific computing, such as predicting climate change or understanding complex biological systems. To meet its R&D needs, ASCR activities occur at 65 academic institutions and 10 DOE laboratories. More than 2,400 university scientists, government agencies, and U.S. companies use ASCR-funded high-performance computers each year.

➔ Performance Against Key Targets

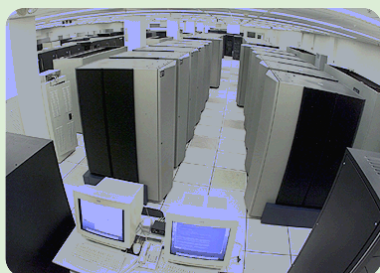
In FY 2005, ASCR:

- Achieved an average 50 percent increase in the computational effectiveness of a subset of application codes within the SciDAC effort. (SC GG 5.23.3) This measure evaluates the contribution of research in applied mathematics and computer science to scientific discovery in the other programs within the SC, and is a key indicator of ASCR's success in enhancing scientific discovery. In many cases, improvement due to this type of advance is equal to advances in hardware speed.

■ Fusion Energy Sciences

➔ How We Serve the Public

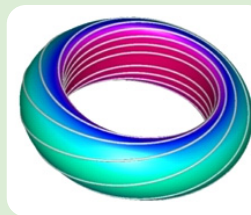
Fusion is the power source of the sun and the stars. The challenge is to understand and produce this energy process on Earth for the benefit of all. Fusion is the process in



The National Energy Research Scientific Computing (NERSC) Center, managed and operated by Lawrence Berkeley National Laboratory, is a world leader in accelerating scientific discovery through computation.

which the two hydrogen isotopes (deuterium and tritium) overcome their nuclear repelling force to combine and transform to helium and a neutron in a super-heated plasma. The advantage is that a small amount of hydrogen isotopes converted to helium creates a large amount of released energy. Fusion will provide a virtually never-ending, safe and environmentally friendly energy source available to the whole world.

- The Fusion Energy Sciences (FES) program supports advances in plasma science, fusion science, and fusion technology required for an attractive fusion energy source – economically and environmentally. The main scientific challenge in fusion sciences is to make fusion energy practical.
- In addition to the significant funding in the U.S. (approximately \$250 million), more than \$1 billion in magnetic fusion research is expended by other nations annually. This creates the opportunity for a joint scientific effort in which experimental results are openly shared promoting international collaboration. In 2003, multilateral negotiations began to site, construct and operate an international fusion facility called ITER. ITER will be the first fusion science facility capable of producing a sustained burning plasma, and is the next major step in demonstrating the scientific and technological feasibility of fusion energy. In FY 2005, negotiations among the Russian Federation, the European Union, Japan, China, Republic of Korea, and the United States yielded a site selection for ITER at Cadarache, France.



Tokamak model



Stellarator model

Magnetic fusion relies on magnetic forces to confine the charged particles of the hot plasma fuel for sustained periods of fusion energy production. Two methods for achieving this are shown. The tokamak utilizes a combination of toroidal and poloidal magnetic fields to generate an overall nested helical structure, which is necessary to keep the plasma stable. The tokamak is presently the leading candidate design for a future "working" magnetic fusion device, which has the ultimate goal of confining high temperature plasmas at sufficiently high densities and long enough confinement times so as to be applicable to fusion power production. Stellarators are another type of "magnetic bottle" which rely on only externally driven 3-dimensional magnetic shaping allowing for steady state operation.

➡ Performance Against Key Targets

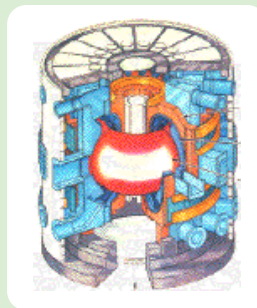
In FY 2005, FES:

- Conducted collaborative experiments between the United States, Japan and Europe on the DIII-D tokamak (at General Atomics) obtaining a result on energy confinement that indicates that ITER, once constructed, may perform better than its baseline design. (SC GG 5.24.1 and 5.24.2) Studying the behavior of high temperature plasmas under a wide variety of conditions indifferent tokamaks obtained through joint experiments under the International Tokamak Physics Activity (ITPA) provides the database needed to develop a predictive capability for optimizing magnetic confinement and understanding burning plasmas. By using a variety of plasma control tools, appropriate materials, and having the diagnostics needed to measure critical physics parameters, scientists will be able to develop optimum scenarios for achieved high performance plasmas in ITER and, ultimately, in reactors.
- Achieved an average operating time at the major national fusion facilities (the DIII-D, the Alcator C-Mod, and the National Spherical Tokamak Experiment) of greater than 90 percent of scheduled operating time, meeting the FY 2005 target. (SC GG 5.24.3) To meet the needs of the research community, these national user facilities are optimally operated.

➡ External Factors Related to General Goal 5

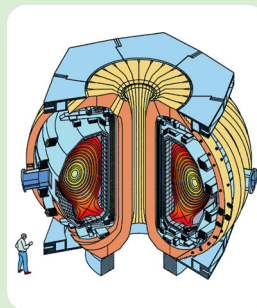
- The prospect of insufficient scientific and technical talent, now and in the foreseeable future, threatens our ability to maintain world-class scientific capacity.
- Also of concern is the imbalance in the overall research portfolio favoring biological research. Investments in the physical sciences underpin progress in other fields, especially rapidly growing linkages between the biological and physical sciences.

Major Collaborative Fusion Facilities



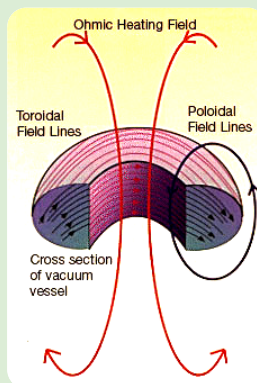
ITER

ITER. The US is engaging in negotiations with international partners aimed at constructing the world's first sustained burning plasma experiment, capable of producing 500 million watts of fusion power for periods of 5 minutes or more.



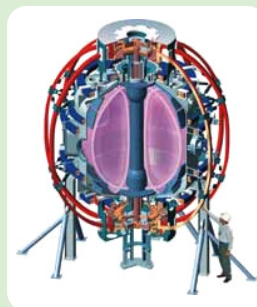
DIII-D

DIII-D (General Atomics) is the largest magnetic fusion research facility in the United States, with plasmas at close to fusion reactor temperatures it has been a major contributor to ITPA joint experiments and to ITER design.



Alcator-C-Mod

Alcator-C-Mod (Massachusetts Institute of Technology) is a unique, compact-tokamak facility that uses intense reactor-level magnetic fields to confine high-temperature, high-density plasmas in a small volume.



NSTX

NSTX (Princeton Plasma Physics Laboratory) is an innovative magnetic fusion device that was constructed by the Princeton Plasma Physics Laboratory in collaboration with the Oak Ridge National Laboratory, Columbia University, and the University of Washington, Seattle.

Environment

— RESOLVING THE ENVIRONMENTAL LEGACY —

To protect the environment by providing a responsible resolution to the environmental legacy of the Cold War and by providing for the permanent disposal of the Nation's high-level radioactive waste.



Brookhaven National Laboratory – The Brookhaven Graphite Research Reactor was the world's first research reactor constructed solely for the peaceful use of atomic energy and operated from 1950 to 1968. This picture shows the demolition of Building 708 due to contamination from normal reactor operations.

The Department has had an environmental mission since its establishment in 1977. This mission has become more important since the end of the Cold War. Fifty years of nuclear defense work and energy research resulted in large volumes of solid and liquid radioactive waste along with significant areas of contaminated soil and water.

The mission of the Department's Environmental Management (EM) program is to safely clean up the contamination from these operations and dispose of the waste in a manner protective of the environment, the workers, and the public. Over the past few years, the program has delivered significant risk reduction and cleanup results while ensuring that the cleanup is safe for workers, protective of the environment and respectful to the taxpayer. These outcomes are providing important and valuable benefits for the generations to come. EM has made significant advances in FY 2005 in accelerating and completing the packaging of plutonium and other high risk nuclear materials for secure storage until disposition in a geologic repository.

Following site closure, the Office of Legacy Management (LM) has as its mission the responsibility to ensure protection of human health and the environment through effective long-term stewardship of land, structures, facilities, and records, as well as the oversight of the Department's post-closure responsibilities for former contractor employees.

Environment Performance Scorecard (\$ in millions)

General Goal and Scores	Program Costs		Program Goals and Scores		FY 2005 Budgetary Expenditures Incurred *				Performance of Annual Targets	
	FY 2005	FY 2004			Met (100%)	Not Met (> 80% but < 100%)	Not Met (< 80%)	Undetermined		
6. Environmental Management	\$6,719	\$6,283	Environmental Management	Y	\$9,402	4	2	2	0	
			Legacy Management	G	\$74	1	0	0	0	
7. Nuclear Waste	\$521	\$530	Nuclear Waste Disposal	R	\$614	3	0	1	0	
Total Cost	\$7,240	\$6,813			\$10,090	8	2	3	0	

* Includes capital expenditures but excludes such items as depreciation, changes in unfunded liability estimates and certain other non-fund costs, and allocations of Departmental administration activities.

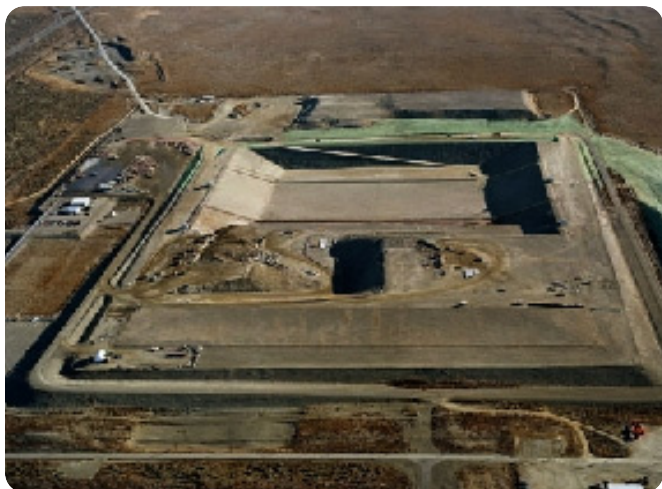
The Office of Civilian Radioactive Waste Management (RW) is responsible for managing and disposing of high-level radioactive waste and spent nuclear fuel in a manner that protects health, safety and the environment; enhances national and energy security; and merits public confidence.

■ General Goal 6: Environmental Management

Accelerate cleanup of nuclear weapons manufacturing and testing sites, completing cleanup of 108 contaminated sites by 2025.

Safety is top priority. EM continues to maintain and demand the highest safety performance in all that it does. EM has focused the cleanup program on risk reduction, cleaning up more efficiently and cost effectively, and working collaboratively with regulators and stakeholders in developing strategies for site closure.

Where EM has completed its mission, the transfer of responsibility for long term surveillance and maintenance,



Hanford Site: Cells 5 and 6 at the Environmental Restoration Disposal Facility (ERDF) were completed as part of the site's accelerated cleanup progress, bringing its total capacity to 8 million tons.

records, pension plans, and post-retirement benefits to LM allows both offices to focus on their primary missions. Concentrating all legacy functions in one office heightens the visibility and, consequently, the accountability to the affected communities for legacy activities.

➔ How We Serve the Public

The Department is addressing the legacy of more than 50 years of nuclear weapons production and nuclear power research and development. The scope of the environmental program includes stabilization and disposition of some of the most hazardous materials known to man. The cleanup program, which resulted from over 5 decades of nuclear weapons production and energy research, is the largest active cleanup

program in the world encompassing over 2 million acres at 114 sites. As of September 2005, the cleanup of 76 sites has been completed.

➔ Performance Against Key Targets

The Department is targeting 89 and 100 geographic sites to be completed by the end of FY 2006 and FY 2012, respectively. To ensure the success of these future interim targets, EM maintains a set of corporate performance measures that enables the program to track the accomplishment of risk-reducing actions at each of its sites. These corporate performance measures are quantitative and provide a comprehensive programmatic perspective to completing the EM mission. The performance measures, each of which has an established annual target, are tracked in the context of the total measure (life-cycle) necessary to complete each site as well as the EM program as a whole. The key performance measures below portray the broad scope of challenges the EM program faces in completing its cleanup mission.

During FY 2005, EM:

- Disposed of a cumulative total of 27,875 cubic meters of transuranic (TRU) waste in the Waste Isolation Pilot Plant (WIPP). As Chart 1 indicates, EM is behind its life-cycle schedule for disposing of a cumulative total of 40,711 cubic meters of TRU waste at the end of FY 2005. (EM GG 6.18.1) EM has taken action to revise and improve procedures and implement corrective actions at Idaho National Laboratory (INL) and Los Alamos National Laboratory in order to achieve sustained shipments. However, the final shipment of TRU waste left the Rocky Flats site in April 2005. This milestone is another step toward the final conversion of the Rocky Flats site to a National Wildlife Refuge managed by the U.S. Fish and Wildlife Service. The shipment of TRU waste to WIPP demonstrates a site's progress in reducing risk and completing cleanup.



This final shipment of transuranic waste from Rocky Flats to the Waste Isolation Pilot Plant in New Mexico completed a 10-year effort to characterize and safely package Rocky Flats' 15,000-cubic-meter inventory.

Chart 1 – TRU Waste Disposed at WIPP

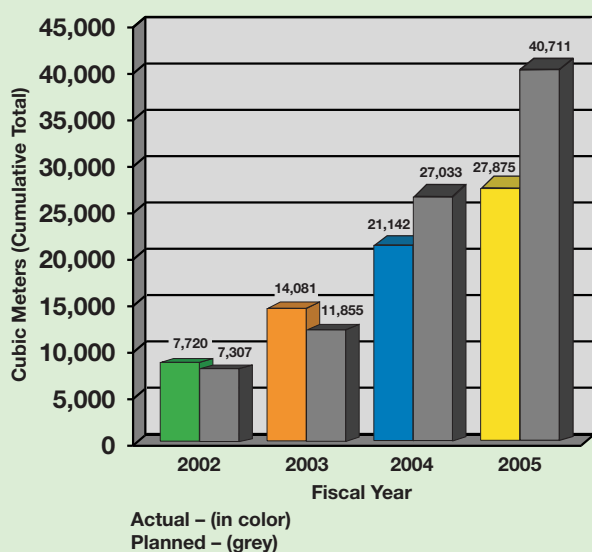
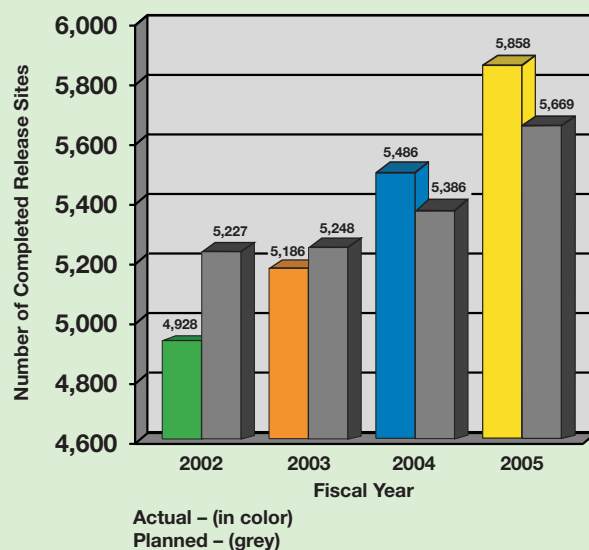
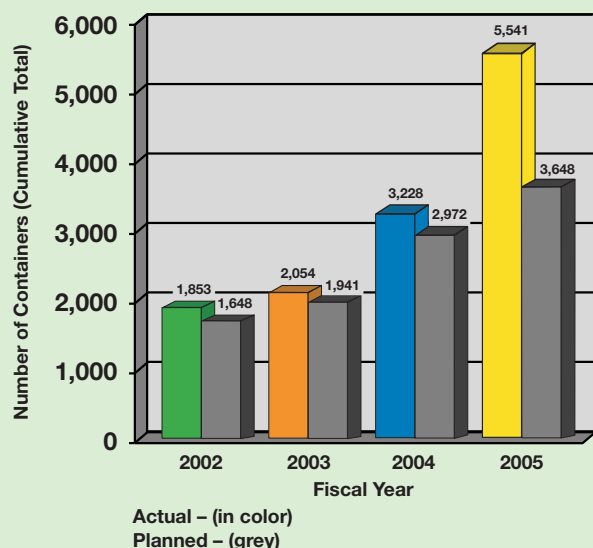


Chart 3 - Completed Release Sites



- Packaged a cumulative total of 5,541 containers of enriched uranium at INL, Hanford, and Savannah River, which is well ahead of its cumulative life-cycle target of 3,648 containers for FY 2005 (see Chart 2). (EM GG 6.18.4) In addition, EM completed the packaging for disposition of plutonium metal or oxide materials at Hanford, Rocky Flats, and Savannah River. These accelerations were due in part to using new technologies for characterizing the containers and handling plutonium. Completing these targets ahead of schedule results in significant risk reduction.
- Completed remediation work at a cumulative total of 5,858 release sites, which exceeds its cumulative life-cycle target of 5,669 release sites for FY 2005 (see Chart 3). (EM GG

Chart 2 - Enriched Uranium Packaged for Disposition



This aerial survey of Rocky Flats using a helicopter-mounted gamma detection system is part of the site's final survey program and provides an added degree of assurance that the cleanup objectives of the Rocky Flats Cleanup Agreement have been achieved and that all areas of surface soil contamination have been identified.

6.18.8) Acceleration in the completion of release sites at Rocky Flats, Lawrence Livermore National Laboratory, Pantex, and Nevada is a good indicator of a geographic site's progress toward completion. When active remediation at all release sites has been completed in accordance with the terms and conditions of cleanup agreements, a geographic site will be considered complete in its entirety.

LM supports the General Goal by ensuring that the Department's long-term agreements and legal commitments to environmental stewardship and to former contractor employees are satisfied. By managing the long-term surveillance and maintenance at sites where remediation has been essentially completed, EM is allowed to concentrate its efforts on continuing to accelerate cleanup and site closure resulting in reduced risks to human health and the environment and reduced landlord costs. In FY 2005, LM successfully met its



View to the south of Yucca Mountain crest showing coring activities.

Navy's spent nuclear fuel. Nuclear waste disposal is also essential for maintaining the viability of the commercial nuclear power industry, which currently supplies more than 20 percent of the nation's electricity. Congress has indicated that continued support for nuclear power development is contingent upon successfully establishing the repository.

➔ Performance Against Key Targets

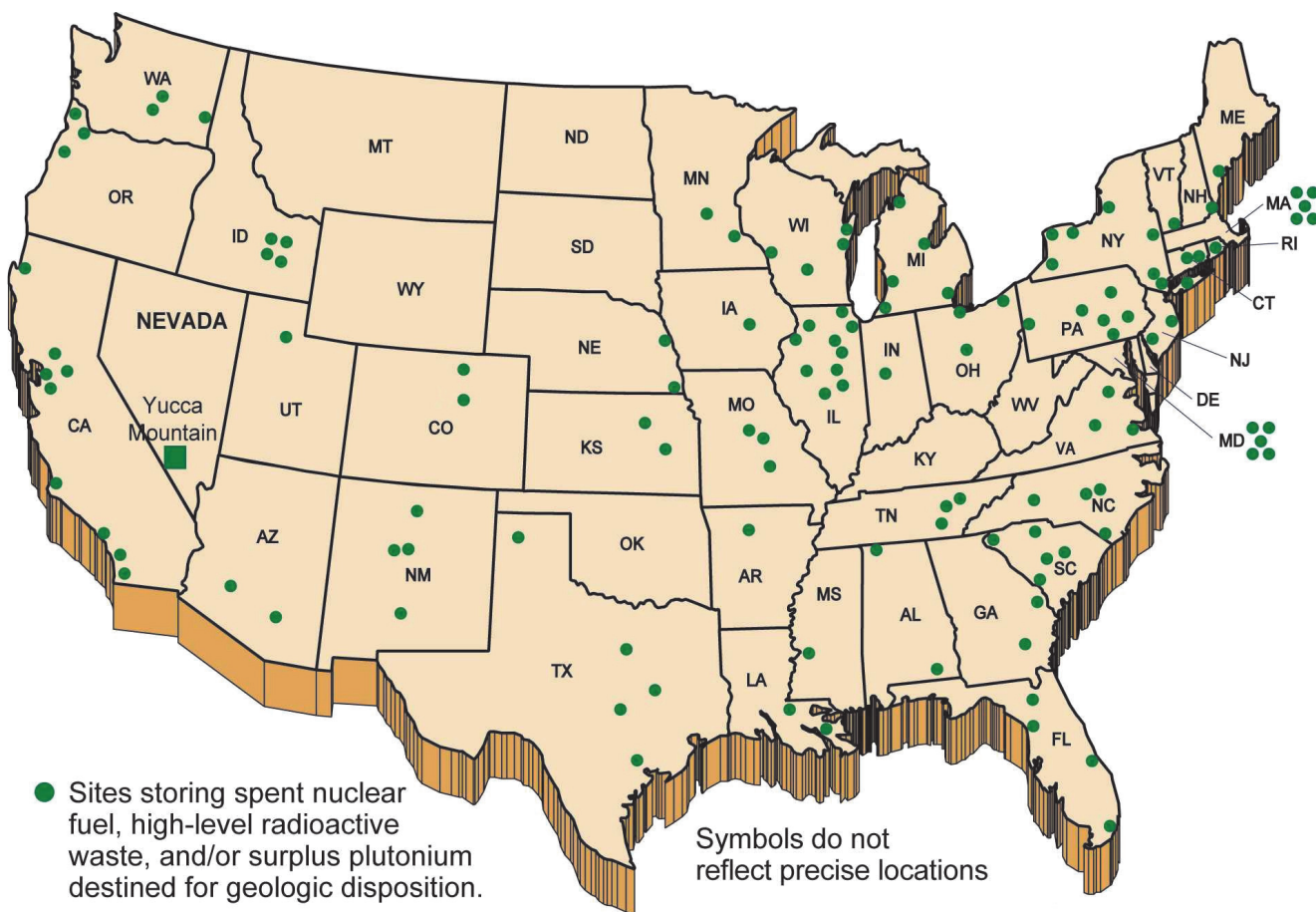
The Department's goal is to license and construct a permanent repository at Yucca Mountain. Accomplishing this goal requires:

- Obtaining a construction authorization from the Nuclear Regulatory Commission (NRC) and subsequently a license to operate the repository.
- Completing construction of the repository and infrastructure to support receipt and emplacement of spent nuclear fuel and high-level radioactive waste.
- Finishing the national and Nevada waste transportation systems in time to support repository operations.

RW continues to establish the framework for initial waste receipt, as well as the infrastructure to support ongoing repository operations.

During FY 2005, RW:

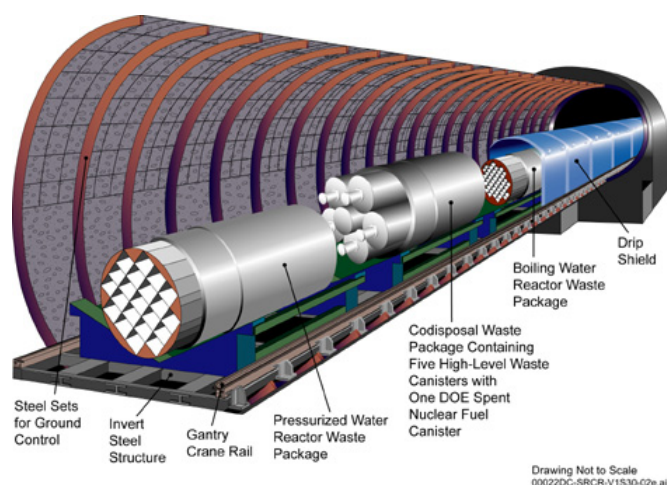
- Focused on finalizing the draft license application and related actions, including: (1) completing total system performance assessment calculations and the final report, and (2) improving the design of the waste package, surface facilities, and subsurface facilities. (RW GG 7.25.1)



A national map of current waste locations.

The Department decided that the draft license application should not be submitted until issues including fuel oxidation, the Environmental Protection Agency's (EPA) radiation standard, and the infiltration model have been resolved. While this decision resulted in the Department not meeting the target as scheduled, resolution of the issues will enable the Department to submit a defensible license application to construct and operate a permanent repository for nuclear waste.

- Completed indexing of approximately 98 percent of DOE's collection of documentary evidence material on the Licensing Support Network (LSN). The LSN is an internet-based document repository that has been established to support DOE's application for a license to construct the Yucca Mountain repository. NRC regulations (10 CFR 2, Subpart J) require DOE and all other participants in the licensing proceedings to produce their relevant documents on the LSN. The Department was in the process of providing its remaining documents and completing various internal validations of its document production on the LSN when NRC's Atomic Safety and Licensing Board's Pre-License Application Presiding Board ordered DOE to produce copies of the draft license application on the LSN. DOE has appealed this order to the NRC. DOE will not certify its LSN collection until NRC has issued a decision on DOE's appeal of this order. (RW GG 7.25.2)
- Completed the field studies, analysis, and conceptual engineering required to support the issuance of a draft Environmental Impact Statement (EIS) for the Nevada rail line. This achievement is crucial for establishing the detailed approach, timetable, costs, and capabilities for transporting the nuclear waste from an existing rail line in Nevada to the repository. The data was incorporated into the draft EIS for DOE internal review in August 2005. (RW GG 7.25.3)



Cutaway of a drift with three types of waste packages.

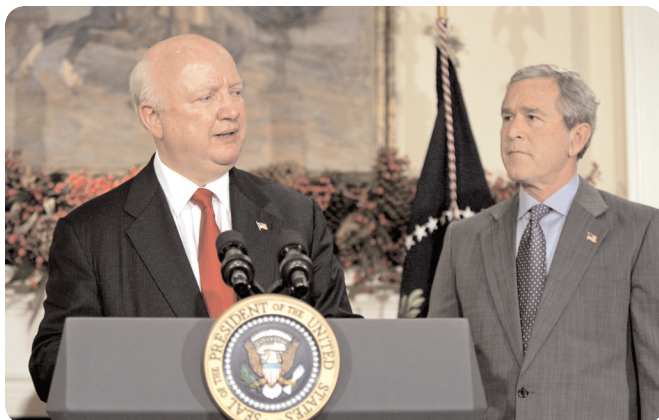
➔ External Factors Related to General Goal 7

The opening date of the Yucca Mountain repository will also depend on resolution of a number of external factors, including:

- **Regulatory Requirements:** The NRC is responsible for reviewing DOE's license application for Yucca Mountain. The NRC requires that the Program certify it has submitted all documents relevant to the licensing process to the DOE LSN six months before the license application is submitted. In August 2004, the NRC issued its ruling striking the certification of the LSN document collection the Department submitted in June 2004. Another obstacle in the preparation and submittal of the license application was the July 2004 decision of the U.S. Court of Appeals to vacate the Environmental Protection Agency's 10,000 year radiation protection compliance timeframe for Yucca Mountain. Rulemaking proceedings by both agencies will be needed in order to establish new regulations consistent with that decision. The revised radiation protection standard could require the reevaluation of some parts of the analysis in the license application.
- **Litigation:** It is likely that any NRC decision to issue a license to construct and operate a repository at Yucca Mountain will be challenged in the courts. These lawsuits, including ones filed by the State of Nevada, local jurisdictions, and others may pose schedule and financial risks to the Program. Another issue concerns ongoing lawsuits by the nuclear utilities. Although the courts have already established the Government's liability for damages stemming from delays in taking possession of commercial spent nuclear fuel in 1998, the amount of those damages is undetermined.
- **Congressional Funding:** Significant budget increases are required if the Program is to reach the goal of developing a geologic repository at Yucca Mountain. To ensure stable and sufficient funding for the design, construction, and operation of the repository, and for acquisition and development of the transportation infrastructure in the future, a restructuring of the Program's funding mechanisms is needed. The Department will continue to work with Congress to ensure that there is sufficient and stable funding available to meet the Program's requirements.

CORPORATE MANAGEMENT

President's Management Agenda



The President, in his 2001 President's Management Agenda (PMA), challenged the Federal Government to become more efficient, effective, results-oriented and accountable. Over the past four years, the PMA has become the primary framework by which the Department has implemented changes to support the President's management goals. The PMA reflects the President's on-going commitment to achieve immediate and measurable results that matter to the American people.

"What matters most is performance and results. In the long term, there are few items more urgent than ensuring that the Federal Government is well-run and results-oriented."

- President George W. Bush

Each agency is held accountable for its performance in carrying out the PMA through quarterly scorecards issued by OMB. Agencies are scored green, yellow or red on their status in achieving overall goals or long-term criteria, as well as their progress in implementing improvement plans.

The Department is scored against seven PMA initiatives: five government-wide areas and two agency-specific areas. Each year, the Department and OMB consider progress made over the previous year and create a plan for the upcoming year's PMA-related activities. The plan is used by the Department to guide further management reforms, and by OMB as the baseline for assessing the Department's quarterly

performance. Further information on OMB's management of the PMA may be found at <http://www.results.gov>.

FY 2005 saw many significant accomplishments in each of the seven PMA areas. These are included in the report *Fueling Progress for America: Results from Implementing the President's Management Agenda*, issued by the Secretary of Energy in July 2005. The full report is available at http://www.energy.gov/engine/doe/files/dynamic/2062005161630_PMAReport2005.pdf. Key achievements in each of the seven PMA areas are discussed below.

Initiative	As of September 30, 2005	
	Status	Progress
Human Capital	Green	Green
Competitive Sourcing	Yellow	Yellow
Financial Performance	Green	Yellow
E-Government	Yellow	Green
Budget & Performance Integration	Green	Green
Federal Real Property Asset Mgt.	Yellow	Green
R&D Investment Criteria*	Red	Yellow

* A common R&D Investment Criteria score is determined for the entire government.

What Progress Indicates

Green: Implementation is proceeding according to plan.
Yellow: Some slippage or other issue(s) requiring adjustment.
Red: Initiative in serious jeopardy absent significant management intervention.

Strategic Management of Human Capital – The Department developed and has begun implementing a comprehensive human capital plan that addresses the Department's organizational structure, work force size, skill gaps, performance management systems, and diversity.

Competitive Sourcing – The Department has studied 1,180 positions since FY 2002 as part of seven competitive sourcing studies. As a result of the competitions completed to date, DOE expects to save taxpayers over \$378 million.

Improved Financial Performance – The Department received a clean audit opinion for the previous six years, with no identified material weaknesses. However, during FY 2005, the Department implemented a new commercial off-the-shelf accounting and financial reporting system and consolidated its finance and accounting operations into a new financial services organization. The major challenges presented by this combination of circumstances adversely impacted the Department’s ability to produce timely, auditable FY 2005 financial statements and, consequently, the auditors issued a disclaimer of opinion on those statements and reported a material weakness in internal control relating to financial control and reporting. Progress has been made in resolving many of the challenges and major efforts are underway to address the remaining challenges. Efforts continue on implementation of I-MANAGE, the Department’s integrated business management system, which will further enhance the ability to make better-informed decisions.

Expanded Electronic Government – The Department has refocused its e-government efforts over the past year to more effectively manage its information technology investment portfolio, improve its cyber security program, mature its enterprise architecture, and enhance controls on personnel security and physical access systems.

Budget and Performance Integration – The Department has made significant progress toward integrating budget and performance information. Performance data from the Program Assessment Rating Tool (PART) reviews, the

Department’s performance measures, and financial data are now being used to make better informed policy, program, resource, and operational decisions.

Federal Real Property Asset Management (Agency-Specific) – The Department has issued an Asset Management Plan that provides guidelines and principles for managing the Department’s \$77 billion real property portfolio. Ten Year Site Plans have been prepared and approved for each of the Department’s major sites. These plans ensure that the facilities and infrastructure are aligned with and capable of supporting current and anticipated mission requirements.

Research and Development Investment Criteria (Agency-Specific) – The costs and benefits of proposed research and development investments are being evaluated according to relevance, quality, and performance. The Department has developed and issued guidance for analyzing and estimating the potential benefits of its research and development programs using standard methods and assumptions.

“Working together, we will achieve our goal of steadily improving every Department of Energy program and continue to transform the Department into an organization that makes good on its promises and delivers results for the Nation.”

- Energy Secretary Samuel W. Bodman

Management Challenges & Significant Issues

The Department carries out multiple, complex and highly diverse missions. Although the Department is continually striving to improve the efficiency and effectiveness of its programs and operations, there are some specific areas within our operations that merit a higher level of focus and attention. These areas represent the most daunting management challenges and significant issues we have in accomplishing our mission. The Reports Consolidation Act of 2000 requires that, annually, the Inspector General (IG) prepare a statement summarizing what he considers to be the most serious management and performance challenges facing the Department. That statement is to be included in the Department's annual Performance and Accountability Report. The Inspector General's statement included in the Financial Results section of this report identifies seven challenges for the Department. Similarly, in FY 2003, the Government Accountability Office (GAO) identified six major management challenges and program risks to be addressed in FY 2005.

After considering the areas identified by the IG and GAO, as well as all other critical activities within the agency, we identified 11 "Significant Issues" that we believe represent the

most important matters facing the Department now and in the coming years. It is our goal that resolution of our Significant Issues will help mitigate the IG and GAO management challenges as well as internally identified issues.

The GAO identified two areas not included by the IG or the Department. The challenges are related to revitalizing the Department's infrastructure and meeting the Nation's energy needs. While the Department recognizes the importance of both of these areas and has included these as issues in the past, based on our progress in reducing these vulnerabilities, we no longer consider these areas to be significant management problems.

The Department aggressively pursues corrective action for all challenges, whether externally identified by the IG or GAO or internally identified by the Department. To further highlight the Department's strategy for mitigating the previously mentioned significant management issues, the following table identifies the Department's Significant Issues for FY 2005 and demonstrates their relationship with the IG and GAO challenges.

FY 2005 MANAGEMENT CHALLENGES AND SIGNIFICANT ISSUES

IG Challenge Area	GAO Challenge Area	Significant Issue Identified by Department
Contract Administration (S)	Resolve problems in contract management that place agency at high risk for fraud, waste and abuse (S)	Oversight of Contractors (S)
National Security (D)	Address security threats and problems (D)	Security (D)
Environmental Cleanup (D)	Improve management for cleanup of radioactive and hazardous wastes (D)	Environmental Cleanup (D)
Stockpile Stewardship (D)	Improve management of the Nation's nuclear weapons stockpile (D)	Stockpile Stewardship (D)
Information Technology (S)		Information Technology Management (S)
Project Management (S)		Project Management (D)
Financial Control and Reporting (S)		Financial Control and Reporting (S)
	Enhance leadership in meeting the Nation's energy needs (D)	
	Revitalize infrastructure (S)	
		Human Capital Management (S)
		Safety & Health (S)
		Nuclear Waste Disposal (D)
		Unclassified Cyber Security (S)

(D) Mission Direct (S) Mission Support

Oversight of Contractors

Description of Issue

Improvements are needed in the oversight of contractors managing and operating the Department's facilities. Specific oversight problems have been identified at environmental cleanup sites, Yucca Mountain and laboratories conducting national security and scientific activities. Adequate oversight is needed to assure that contractor operations are effective and efficient.

Expected Completion

Correction is expected to extend into the out-years with the completion date to be reassessed in FY 2006.

Actions Taken & Remaining

An improved contract administration structure that focuses on performance-based contracts has been put in place. An acquisition approach was implemented to drive performance by clearly identifying the work to be done, the Department's expectations, establishing proper incentives for its contracts, and adequately rewarding performance.

EM established the Contract Management Advisory Council (CMAC) to ensure aggressive and consistent contracting strategies are implemented. The CMAC, part of EM's Configuration Control Board, also provides increased coordinated oversight of contracts and associated projects. EM's strategy ensures performance-based incentives are included in contracts to align with site risk reduction and closure objectives and to review acquisition strategies to ensure optimal support of cleanup objectives.

RW began the development of a comprehensive action plan that will provide clearer and more objective performance standards for the managing and operating contractor for the Yucca Mountain Project.

SC began implementing a new organizational structure in April 2005 wherein each Site Manager became an Administrative Contracting Officer with at least one level III contracting officer on staff. Beginning in FY 2006, SC will be conducting both technical and business reviews with each of its laboratory contractors. These combined SC actions are further strengthening SC's laboratory oversight approach. SC also completed revision of laboratory performance measures utilized for reviewing scientific and operational performance at all of its national laboratories. The new measures will be fully implemented in FY 2006.

In FY 2005, NNSA implemented its reengineering plans. The NNSA Senior Procurement Executive issued and implemented a series of Acquisition Letters in the form of Business Operating Policy letters. These letters, in part, address the accountability expectations of contractor performance, Site Manager metrics, Program Officer expectations, and the roles and responsibilities of contracting officers.

Security

Description of Issue

Unprecedented security challenges have evolved since the events of September 11, 2001. The need for improved homeland defense, highlighted by the threats of terrorism and weapons of mass destruction, created new and complex security issues that must be surmounted to ensure the protection of our critical energy resources and infrastructure. These have made it necessary for the Department to reassess and strengthen its physical and cyber security postures.

Expected Completion

Long-term correction is expected due to the continuing nature of security threats.

Actions Taken & Remaining

In May 2004, the former Secretary of Energy announced a set of sweeping new initiatives to improve security across the Department's nationwide network of laboratories and defense facilities, particularly those housing weapons-grade nuclear material. Completion of these initiatives will ensure the Department has a clear strategic security plan outlining the Department's future security course, conducts ongoing threat analyses to establish the framework for continually improving security protective measures, and enhances the physical security of our facilities. In FY 2005, a number of actions were taken to improve security across the Department. These actions included: providing NNSA with technologies to support the keyless systems initiative; establishing the Center of Excellence for Technology Deployment to improve the effectiveness and efficiency of protection programs; implementing consolidation of nuclear materials through the Nuclear Materials Disposition and Consolidation Coordination Committee; strengthening security human capital expertise through implementation of the Chiles Report recommendations and curriculum development and implementation of the Professional Development Program at the National Training Center; expanding cyber security performance testing to identify potential vulnerabilities; and providing sites with technology and protective force tactical options to address the October 2004 Design Basis Threat Policy. Additionally, in June 2005, the Secretary of Energy approved the DOE oversight policy to ensure DOE line management and contractor assurance processes are established to further enhance the protection of national security assets throughout the Department. The Department also completed implementation of the Cyber Security Enhancement Initiative during FY 2005.

The NNSA implemented corrective action plans to address the recommendations provided by special study groups in security operations and personnel during FY 2005 and continued to implement the Design Basis Threat Policy throughout the NNSA complex. NNSA also implemented a cyber security program with the publication of a series of Business Operating Policy letters that address all aspects of cyber security. It is anticipated that problems with security operations and personnel within the NNSA will be addressed through FY 2006.

Environmental Cleanup

Description of Issue

There are significant long-term compliance and waste management problems at the Department's facilities due to past operations that left risks to the environment. Even though these issues resulted from earlier activities conducted in a different atmosphere and under less stringent standards than today, the Department is committed to maintaining compliance with current environmental laws and agreements.

Expected Completion

Long-term correction expected with completion date to be reassessed in FY 2006.

Actions Taken & Remaining

Continuous progress has been made in cleaning up contaminated sites. EM's Top-To-Bottom Review has resulted in an aggressive approach taken to implement an accelerated cleanup strategy with an emphasis on risk reduction and continuous improvement in safety. The time span to complete the cleanup mission has been reduced by 35 years, from 2070 to 2035. In addition to accelerated cleanup, EM implemented resource loaded baselines at all but six sites during FY 2005. Since approved site baselines account for 90% of EM's mission-related life cycle costs, the program is currently monitoring the vast majority of its project performance towards meeting site closure goals. The remaining six site baselines are projected to be completed and approved during FY 2006. The current status of the EM program was published in the June 2004 EM Closing Planning Guidance which contains all the necessary strategy and performance elements required to carry out the cleanup program by 2035.

Stockpile Stewardship

Description of Issue

Stewardship of the Nation's nuclear weapons stockpile is one of the most complex, scientifically technical programs undertaken and the Department needs to ensure that all aspects of this mission-critical responsibility are fulfilled. Based on stockpile stewardship activities, the Secretary, jointly with the Secretary of Defense, annually certifies to the President that the nuclear weapons stockpile is safe and reliable and that underground nuclear testing does not need to resume. Success is dependent upon unprecedented scientific tools to better understand the changes that occur as nuclear weapons age, enhance the surveillance capabilities for determining weapon reliability, and extend weapon lives. The Department must ensure that problems in these areas are aggressively addressed.

Expected Completion

FY 2006

Actions Taken & Remaining

Processes have been put in place to eliminate a backlog of surveillance tests and resolve deficiencies in the investigations conducted when weapons problems are identified. Plans and financial controls over weapons refurbishment have been strengthened. Self-assessments of project management processes of the Enhanced Surveillance Campaign have been completed and all sites have developed an Enhanced Surveillance Campaign Project Management Improvement Plan. Also during FY 2005, the Enhanced Surveillance Campaign Risk Management Plan was issued. The Life Extension Program and sub-elements are now subject to the NNSA's Planning, Programming, Budgeting and Evaluation processes and the Department's project management processes. Resource loaded plans that contain cost, scope, and milestones were implemented for the Enhanced Test Readiness Program during FY 2005. NNSA continues to develop the Risk Management Plan for Test Readiness.

Information Technology Management

Description of Issue

The Department has a decentralized approach to information technology management, limited control by the Chief Information Officer in the budgeting process, and lack of an information technology baseline to guide management decisions. These problems have impeded the Department's ability to effectively manage its information technology resources.

Expected Completion

FY 2006

Actions Taken & Remaining

Management of information technology (IT) has been strengthened by making the Chief Information Officer (CIO) a direct report to the Secretary and the primary official for agency information technology issues. The Department has revitalized its IT Council to assist the CIO in managing the Department's IT resources. The Department has fully implemented the IT capital planning process and IT selection is performed in alignment with the budget formulation process. The IT Council also conducts quarterly control reviews of the Department's major information systems to ensure that projects are performing to cost, schedule, and performance goals and guidance on Post-Implementation Reviews ensures that appropriate evaluation occurs. In addition, the IT Council has chartered a specific Integrated Project Team to address management of the Department's Consolidated Infrastructure Investment, with emphasis on consolidating like elements within that infrastructure where investment dollars can be saved or avoided without impact to the mission consistent with DOE's enterprise architecture (EA).

A strategic plan targeted at Clinger-Cohen Act reforms has been developed and an FY 2005 update of the high-level EA and the modernization blueprint were submitted to OMB and approved in June 2005. Policy updates to DOE Order 413.3 to clarify CIO roles and responsibilities and strengthen IT governance are underway. The EA Repository has been implemented and populated with baseline data, and expanded to integrate the President's Management Agenda Initiatives.

NNSA continues to work with the Department's CIO in all areas of IT and participates with the rest of the Department in all e-Gov initiatives.

Project Management

Description of Issue

The Department needs to improve the discipline and structure for monitoring project performance and controlling program and baseline changes to projects as well as the Department-wide approach for certifying Federal Project Directors at predetermined skill levels to ensure competent management oversight of resources. In addition, it was determined that the Department needs stronger policies and controls to ensure that ongoing projects are reevaluated frequently in light of changing missions.

Expected Completion

FY 2007

Actions Taken & Remaining

Implementation of the program to certify contractors' earned value management systems continued during FY 2005. An aggressive review schedule was developed which will result in eight major contractors being reviewed in FY 2005 and ten in FY 2006 out of a current total of 31 major contractors requiring certification. At least seven contractors are expected to achieve certification in FY 2006.

During FY 2005, the number of certified Federal Project Directors rose to 95. This represents a significant increase from the 35 Project Directors certified in accordance with the Project Management Career Development Program at the close of FY 2004. By the end of May 2006, a certified Federal project director must lead all departmental capital asset projects over \$5 million. In addition, the CIO has established a qualification process for IT Project Managers that is aligned with the Federal CIO Council approved process. All major IT investments have qualified project managers.

EM has applied project management principles to all cleanup projects with a total estimated cost greater than \$20 million. As of October 2004, EM completed initial reviews of resource-loaded cost and schedule baselines for 89 projects, including seven line-item construction projects. The baselines, which reflect an accelerated cleanup and closure strategy, describe in detail the activities, schedule and resources required to complete the EM cleanup mission at each site or to construct a major facility at a site. Independent reviews have been conducted for 61 of the 89 EM projects. The remaining reviews are being scheduled and will be conducted as expeditiously as possible. DOE has also utilized the U.S. Army Corps of Engineers to conduct independent reviews on several major high-risk projects.

During FY 2005, NNSA issued a Business Operating Policy on Project Management and continued the certification process of its construction Project Managers. Furthermore, the Department conducts senior management reviews of projects on a quarterly basis.

Financial Control and Reporting

Description of Issue

The overlapping implementations of the financial services Most Efficient Organization (MEO), the Integrated Management Navigation System (I-Manage) Standard Accounting and Reporting System (STARS) and Data Warehouse (IDW) have resulted in a new organizational structure for performing financial services and accounting operations, a new financial management system, numerous business process changes, centralization of accounting functions, a new chart of accounts (standard general ledger) and new accounting codes. As a result, the Department is now faced with many challenges related to data conversion, data/system reconciliation and start-up operations. In addition, the Department missed critical milestones in preparing its FY 2005 consolidated financial statements for audit.

Expected Completion

FY 2006

Actions Taken & Remaining

A large number of the initial challenges associated with standing up the new financial services organization and conversion to the new financial management system in FY 2005 have been overcome. Many of the transactions processing backlogs experienced in the initial start-up have been brought under control as the staff gained operational experience. Also, to ensure system data integrity, key reconciliations are being performed and corrective actions are underway to resolve data conversion issues from the Department's legacy accounting systems to STARS. These reconciliations, once completed, should provide reasonable assurance that the Department's accounting data used for funds control and financial reporting are accurate.

During FY 2005, resources were allocated to the STARS and IDW Project Teams and to the Office of Financial Management to expedite the corrective actions related to data conversion, data/system reconciliation, and start-up operations. To supplement Federal staffing in these areas, contractual support was added, where needed, in FY 2005. Issues and corresponding corrective actions have been well documented and progress made is formally reported to senior management on a weekly basis. Responsible senior managers are fully engaged in the day-to-day management of the corrective actions.

Human Capital Management

Description of Issue

Since 1995, the Department has experienced a 25 percent reduction in the workforce. In Fiscal Year 2005, up to 40 percent of the Department's critical workforce is eligible for retirement within the next 5 years. Combined with other factors such as lengthy moratoria on hiring, the relative age of the workforce, and a variety of incentives to leave Federal service, the decline in staffing has left the Department with a significant challenge: reinvesting in its human capital to ensure that the right skills, necessary to successfully meet its missions, are available.

Expected Completion

FY 2007

Actions Taken & Remaining

A Departmental framework for addressing this issue was put in place with the implementation of a comprehensive human capital management strategy; an improved senior executive performance management system; a guide on developing and retaining a highly-skilled workforce; and business visions and workforce plans for all major offices.

During FY 2005, efforts continued to re-shape the Department's workforce through increased emphasis on performance and accountability. While continuing its reorganization efforts, EM implemented various new initiatives that foster performance excellence, leadership continuity, and knowledge sharing. EM also utilized an innovative approach to use Voluntary Separation Incentive Payments and Voluntary Early Retirement Authority. NNSA implemented all of its re-engineering plans, enabling it to ensure that all key programmatic and site offices are right-sized to meet changing mission requirements. The Department will continue to conduct human capital analyses, identify skill mix issues, and realign the Department complex-wide to ensure a workforce that is fully capable of meeting its responsibilities.

During FY 2006, the Department intends to make significant strides in closing skills gaps in its critical occupations, specifically in the areas of project and contract management (including information technology management), as well as financial assistance.

Safety & Health

Description of Issue

Ensuring the safety and health of the public and the Department's workers is one of the top priorities in accomplishing our challenging scientific and national security missions. Due to the inherently critical nature of these issues, there is the need for continuous vigilance and improvement. Currently, the Department is addressing explosives safety issues and, with the ongoing re-engineering of the NNSA workforce, needs to ensure that adequate focus on general safety at our laboratories and plants is maintained.

Expected Completion

Long-term correction expected with completion date to be reassessed in FY 2006.

Actions Taken & Remaining

Significant actions have been taken to mitigate Safety and Health concerns. In June 2005, the Secretary of Energy approved a new DOE oversight policy to ensure DOE line management and contractor assurance processes are established to further enhance the protection of the public, the Department's workers, and national security assets. During FY 2005, the Office of Security and Safety Performance Assurance (SP) conducted inspections to evaluate the effectiveness of selected institutional safety & health processes and the implementation of core functions of Integrated Safety Management at the activity level, the functionality of essential safety systems, and oversight and assessment processes. Independent oversight reviews also examined the Department's nuclear facility safety system oversight process, the Unreviewed Safety Question Process, Chronic Beryllium Disease Prevention Program, Environmental Management Program, and corrective action management. In addition, a follow-up review was conducted to assess the effectiveness of corrective actions taken to address findings from the SP 2004 special investigation of worker vapor exposures and occupational programs medical services at the Hanford Site.

In FY 2005, EM completed assessments at major EM sites related to adequacy of hazard controls, with a particular emphasis on specific administrative controls. Also in FY 2005, SC continued efforts to identify benchmarks for safety performance and establish a best-in-class performance measure based on performance by the top 10 percent of similar research and development industries. These goals are institutionalized and are being incorporated into the lab appraisal plans. SC's plan is to have all labs performing in the top 10 percent of R&D industries by the end of FY 2007. In addition, the Office of Nuclear Energy, Science and Technology completed reviews of Advanced Test Reactor (ATR) safety systems in FY 2005 and will continue these reviews as part of the ATR Documented Safety Analysis reconstitution project, in support of the ATR Life Extension Program.

As part of NNSA's effort to increase emphasis on safety, during FY 2005, NNSA established and staffed a Chief, Defense Nuclear Safety advisor position to advise the Administrator and oversee nuclear facility safety throughout the NNSA complex. Additionally, as part of NNSA's structure, emphasis has been placed in staffing facility representatives at each site to manage, implement, and oversee safety processes, procedures, and the implementation thereof.

Nuclear Waste Disposal

Description of Issue

A repository for the Nation's spent nuclear fuel and high-level radioactive waste has not been opened as required by the Nuclear Waste Policy Act. Delays in milestones and revisions to cost and schedule baselines have been required as a result of funding short-falls and other external and internal factors, including court-ordered revision of the radiation protection standard, NRC's rejection of the Licensing Support Network, deficiencies in the quality assurance program and technical issues associated with the managing and operating contractor's draft license application. A mechanism needs to be established to assure the necessary funding is available to permit the timely acceptance and disposal of waste.

Expected Completion

Reassessment will occur in FY 2006 upon finalization of a funding mechanism.

Actions Taken & Remaining

Extensive scientific testing determined that Yucca Mountain, Nevada, is suitable for the disposal of spent nuclear fuel and high-level radioactive waste and, in 2002, the President designated it as the site for the Nation's first repository. While future long-standing financial commitments will be required, the Yucca Mountain project continues to make progress toward the goal of opening the deep geologic repository and beginning acceptance of waste. The President's FY 2005 budget request contained a proposal to reclassify the annual receipts from nuclear utility ratepayers to be credited as offsetting collections in order to provide adequate appropriations for developing the Yucca Mountain repository and transportation infrastructure.

The Department also established a formal Configuration Control Board to control cost, schedule, and work scope changes. In addition, detailed Product and Milestone Management Plans are being developed to help ensure all requirements are identified and to facilitate a better understanding of the interrelationships among activities and their importance to waste emplacement. Also, the FY 2005 draft Capital Asset Management Plan was provided to OMB in November 2004.

Work is progressing on strengthening the repository license application through a proposed program redirection to simplify the operations of the repository by accepting primarily canistered commercial spent fuel from utilities, by evaluating the impacts of the proposed revision to the EPA radiation protection standard, by addressing NRC concerns associated with the Department's portion of the Licensing Support Network, and by reevaluation of water infiltration models prepared by U.S. Geological Survey personnel. The Department is also preparing a draft Environmental Impact Statement for the alignment, construction, and operation of a rail line to the Yucca Mountain site.

If funding reform legislation is not authorized by Congress, the Department will continue to experience funding uncertainties and require other policy decisions and actions.

Unclassified Cyber Security

Description of Issue

In July 2005, the Deputy Secretary established a Cyber Security Improvement Initiative. The goal of the initiative was to identify improvements that could be made in management, operational and technical cyber security controls within the Department. The first phase of the initiative resulted in the identification of a number of improvements that could be made to cyber security across the agency. The second phase involved conducting Site Assistance Visits (SAVs) to evaluate implementation of cyber security policies and standards, and test the effectiveness of security controls. SAVs have been conducted at several sites, with planned expansion to other DOE operations.

Expected Completion

Long-term corrective action is expected due to the continuing nature of security threats.

Actions Taken & Remaining

The Cyber Security Project Team, under the direction of the CIO, with participation from NNSA, the Office of Energy, Science and Environment, and SP, is charged with developing the action plan to improve cyber security across the DOE complex. The team will develop recommendations regarding actions needed to address overall cyber security, including recommendations to address near and long-term management, operational and technical controls improvements. The project team will use the National Institute of Standards and Technology (NIST) standards and guidance to support its efforts. Finally, the project team will undertake remaining activities of the Cyber Security Improvement Initiative and integrate the issues and recommendations into a final report to be delivered to the Deputy Secretary in November 2005.

NNSA and ESE continue to work with SP and the CIO in the Cyber Security Improvement Initiative activities. Implementation plans for NNSA's enhanced cyber security directives have been developed by NNSA field organizations.

Management Control Systems

Federal Managers' Financial Integrity Act

The *Federal Managers' Financial Integrity Act* (FMFIA) of 1982 requires that agencies establish management control and financial systems to provide reasonable assurance that the integrity of Federal programs and operations is protected. Furthermore, it requires that the head of the agency provide an annual assurance statement on whether the agency has met this requirement and whether any material weaknesses exist. The Secretary's FY 2005 annual assurance statement is included in his message at the beginning of this report.

In response to the FMFIA, the Department developed a management control program which holds managers accountable for the performance, productivity, operations and integrity of their programs through the use of management controls. Annually, senior managers at the Department are responsible for evaluating the adequacy of the management controls surrounding their activities and determining whether they conform to the principles and standards established by the OMB and the GAO. The results of these evaluations and other senior management information are used to determine whether there are any management control problems to be reported as material weaknesses. The Departmental Internal Control and Audit Review Council, the organization responsible for oversight of the Management Control Program, makes the final assessment and decision for the Department.

For FY 2005, 11 significant issues have been identified that represent key areas of focus for the Department where aggressive actions are being taken, including activities to address financial control and reporting issues noted in our Federal Financial Management Improvement Act reporting.

Federal Financial Management Improvement Act

The *Federal Financial Management Improvement Act* (FFMIA) of 1996 was designed to improve Federal financial management and reporting by requiring that financial management systems comply substantially with three requirements: (1) Federal financial management system requirements; (2) applicable Federal accounting standards; and (3) the United States Government Standard General Ledger at the transaction level. Furthermore, the Act requires independent auditors to report on agency compliance with the three stated requirements as part of financial statement audit reports. The Department has evaluated its financial management systems and, based on issues identified in the area of financial control and reporting, the Department is reporting a FFMIA non-compliance. Additionally, our

independent auditors have reported compliance issues related to the material weakness on financial management and reporting controls. A complete description of the issue and the Department's planned corrective actions is provided on page 49 of the report.

Federal Information Security Management Act

The *Federal Information Security Management Act* (FISMA) of 2002 directs Federal agencies to conduct annual evaluations of information security programs and practices. It provides a comprehensive framework for establishing and ensuring the effectiveness of security controls for information and information systems that support Federal assets and operations. In accordance with FISMA, the CIO is responsible for developing, maintaining, ensuring compliance with and reporting annually on the agency's cyber security program. The IG is charged with conducting an annual, independent review of the agency's cyber security program, and reporting its findings to Congress and the Executive Office of the President. Independent reviews conducted by the CIO and other work performed by the IG have identified problems in the areas of contingency planning, consistent performance of certification and accreditation, and the implementation of other cyber security controls.

The Department's FISMA reporting indicates success in fortifying external protection capabilities over the past fiscal year and a current focus towards improving internal cyber security controls. The CIO will direct future efforts on strengthening line-management accountability and defense-in-depth across the Department's enterprise.

The IG's FISMA report for FY 2005 indicates that the Department continues to focus its attention on strengthening its cyber security posture. It noted that the Department issued policy designed to address security weaknesses in areas such as certification and accreditation and the implementation of minimum security configurations. It also noted that the Department recently initiated a Cyber Security Improvement Initiative to help identify and resolve cyber security problems by providing site assistance and following up on corrective actions. The report also identified opportunities where the Department could further improve its cyber security program.

The Department's senior management remains committed to improving the Cyber Security Program, and will continue to work collaboratively to ensure that the Department's information and information systems are adequately protected.

Improper Payments Information Act

The *Improper Payments Information Act* (IPIA) of 2002, Public Law (P.L.) No. 107-300, requires agencies to annually review their programs and activities to identify those susceptible to significant improper payments. In addition, the Defense Authorization Act (P.L. No. 107-107) established the requirement for government agencies to carry out cost effective programs for identifying and recovering overpayments made to contractors, also known as “Recovery Auditing.” The OMB has established specific reporting requirements for agencies with programs that possess a significant risk of erroneous payments and for reporting on the results of recovery auditing activities.

While the Department does not have any programs that meet the OMB criteria for significant risk, improper payments are monitored on a quarterly basis to ensure our error rates remain at minimal levels. The Departmental erroneous payment rate has remained at or below one

percent since the inception of our tracking program in FY 2002. To support continued success, the Department has committed to pursue reduction of improper payments at any one of the Department’s payment sites that exceed a target rate of 1/10 of 1 percent for any quarter. Currently, the majority of all sites are below the target and the sites above target have identified corrective actions.

The Department has established a policy for implementing recovery auditing requirements. This policy prescribes requirements for identifying overpayments to contractors and establishes reporting standards to track the status of recoveries. Analysis of payment activities confirmed a low percentage of overpayments and a high recovery rate. The Department will continue to focus on both the identification and recovery of improper payments to maintain our record of low payment errors and ensure effective stewardship of public funds. Detailed information on IPIA reporting required by OMB is available in the Appendices.

Improper Payments (\$ in millions)

	FY 2002		FY 2003		FY 2004		FY 2005	
	Dollars and/or Rate		Dollars and/or Rate		Dollars and/or Rate		Dollars and/or Rate	
Total Payments	\$23,587		\$22,695		\$23,639		\$24,115	
Total Improper Payments	\$11.2	0.05%	\$13.7	0.06%	\$20.3	0.09%	\$14.5	0.06%

Note: In FY 2004, Federal payroll payments were excluded due to the outsourcing of the Department’s Federal payroll function.

FY 2004 Overpayments to Contractors (\$ in millions)

	Dollars
Total Overpayments	\$ 10.60
Total Recovered	\$ 9.50
Total Pending Recovery	\$ 1.05
Total Unrecoverable	\$.06

Note: Overpayment information required for prior year only.